MARKETING CHANNELS AND PRICE SPREAD OF AQUACULTURE PRODUCTS

DISSERTATION SUBMITTED BY

P. K. JOHNY

IN PARTIAL FULFILMENT OF THE DEGREE OF

MASTER OF SCIENCE (MARICULTURE)

OF THE

COCHIN UNIVERSITY OF SCIENCE AND TECHNOLOGY

POST-GRADUATE PROGRAMME IN MARICULTURE

CENTRAL MARINE FISHERIES RESEARCH INSTITUTE

(Indian Council of Agricultural Research)

COCHIN-682 014

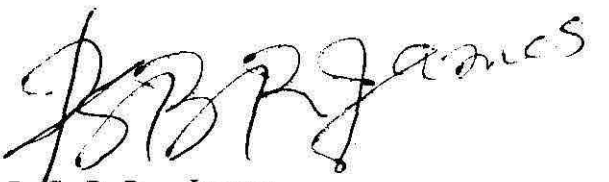
NOVEMBER 1993

C E R T I F I C A T E

This is to certify that this Dissertation is a bonafide record of the work done by **SHRI. P.K.JOHNY** under my supervision and that no part thereof has been presented before for any other degree.

Dr.R.Sathiadhas,
Scientist - SG
Central Marine Fisheries
Research Institute,
Cochin - 14.

Counter signed by



Dr.P.S.B.R. James,
Director,
Central Marine Fisheries
Research Institute,
Cochin - 14.

C O N T E N T S

P R E F A C E

Shrimps occupy a commanding position in the global market by virtue of its ever increasing demand and competetive international prices. A major advantage of aquaculture is that production can be market oriented as against the production oriented marketing in capture fisheries. A proper understanding of consumer demand and the consumer's attitudes is a major pre-requisite in planning a viable aquaculture production programme. The systems and technologies of farming to be adopted will also be governed by the nature of the market. It is also quite obvious that the quality and size at harvest, as well as the methods of processing depends very much on the market. The world market for shrimp has been doubled within the last 10 years and aquaculture race for shrimp has started vigoursly in many parts of the world. As the production increases the market is also expanding every year due to the increase indispensable income of the consumers together with the increased rate of consumption. Commercial shrimp landing in the world is now reportedly stagnating at 1.7 million tonnes and the only alternate means of increasing production is to resort to shrimp culture.

Marketing is the key to aquaculture developments. The appropriate development of marketing should help the producer to get returns and the consumer to get the shrimp at a reasonable price. The entire mechanism of aquaculture product marketing needs a change to ensure that farmers do not make distress sales at the time of harvest. Producers, especially small and marginal farmers by and large, are continued to be exploited by the middlemen. It is in

this background that the marketing study on aquaculture products have a significant role to play. Marketing co-operatives are bound to assume greater importance in the coming years in the context of increase in aquaculture production through the latest methods of highly intensive scientific Shrimp farming.

Seafood sector is growing into a multimillion dollar industry with immense potential for the future. It is one of the fast moving commodity with persistent demand and high unit value. Cultured shrimps have opened a new frontier to tap high income market in many industrialised nations. The quality standards of the aquaculture products should be high inorder to fetch a better market price in the world trade.

Shrimp has been the "Prima donna" of Indian fishery export since it contributes about 74% of the value earned through marine products export. According to the latest reports of the Marine Products Export Development Authority, 74393 M. tonnes of frozen shrimp were exported with a value of 1180 crores during 1992-93. This accounts for 67% of the value of total marine products exports. India has also exported 8587 M.tonnes of IQF prawns valuing 128 crores during 1992-93. At present India is exporting majority of its shrimps as Block frozen (85%) form and IQF (14%) with minor quantities of dried and accelerated freeze dried products.

Like other shrimp suppliers, Indian shrimp exporters also depend on the foreign markets like Japan, Western Europe, and USA. Unfortunately in recent years our country is loosing her market share

to China, Indonesia and Thailand. In the US market, Indian shrimp consists mostly of peeled products totalling about 75% of the quantity exported. Japan continued to be the larget buyer of Indian marine products, accounting for a share of 46% followed by Western Europe (29%) and USA (11%) during 1992-93. Singapore, Hong Kong, UAE, and other Gulf countries are also growing markets for Indian fishery products. Prawn exports have been growing steadily in recent years mainly due to increase in production from aquaculture, larger demand for Indian prawns in the export markets and high unit value realisation. By increasing the production of shrimps through aquaculture, India hopes to reap a prawn harvest of around one lakh tonnes by the end of this century. This will be a major step in implementing many promotional and developmental programmes to attain "Blue Revolution".

Since India started scientific shrimp farming late, we failed to cash-in on the lucrative shrimp market, during the eighties. Indian aquaculture products are harvested from pollution free waters and they should fetch premium price in the world market. At present our aquaculture shrimps contributes to only 15% of the total quantity of shrimp production. It is fortunate that our 1.3 million hectares of coastal inland waters in various states form an ideal environment for shrimp culture. However, at present we are utilizing only 70,000 hectares of brackish water areas with a total production of only 45,000 M.tonnes. Since most of this production comes from traditional aquaculture practices, it yields only a low unit production per hectare.

Eventhough India has a vast potential of utilizing various aquatic organisms like prawns, finfishes, seaweeds, crabs, lobsters, Seacucumbers and molluscs, at present we are culturing only prawns and some finfishes. Penaeus indicus (WHITE) and P. monodon (TIGER) are the two common species of shrimps that are widely utilized for aquaculture. They are the star performers both in the internal and export markets. For the full exploitation of the marketing opportunity of these commercial species and to bridge the gap between demand and supply, shrimp farming has to be developed on a very large scale.

Kerala alone which is the home state of the shrimp oriented seafood export industry is blessed with 65,000 ha. of brackish water of which only 13,000 ha. are utilized at present. Eventhough, Kerala produces 23% of total aquaculture prawns, the production per ha. is very low (500-600 kg/ha) because most of the farmers follow the traditional prawn filteration practices. The products from these farms are a mixture of different varieties of prawns and fishes and the marketing is also much complicated than the scientific methods of farming. Although there has been a wide expansion of aquaculture in India not much research work has been made about the marketing aspects of aquaculture products.

In the present study an attempt has been made to scan the domestic and export marketing of the aquaculture products. High prices are found to be one of the major constraints affecting the domestic consumption of cultured shrimps. An attempt has also been

made to find out the problems faced by the producers, intermediaries and exporters in the marketing of aquaculture products. Besides, an analysis of the present level of trade through different marketing channels of different farming systems, price spread at various stages of its movement and share of producer in consumer's rupee has been evaluated which will be helpful to formulate further strategies for the development of aquaculture industry.

I wish to express my deep sense of gratitude to my supervising teacher Dr. R. Sathiadhas, Scientist (S.G.), CMFRI Cochin, for his constant advice, inspiring guidance and whole hearted support, throughout the course of this study and in the preparation of the manuscript. I express my sincere thanks to Dr. P.S.B.R James, Director, CMFRI Cochin for all the facilities provided. I am much obliged to Dr. C. Suseelan, Senior Scientist, Officer Incharge of PGPM for his valuable suggestions and encouragement. I am thankful to Mr. A.A. Jayaprakash, Semester Incharge for providing necessary facilities to carry out this work. I am grateful to Shri. K.K.P. Panikkar, Scientist (S.G) for his valuable suggestions.

I record my gratitude to Mr. A. Aboobacker, Mr. A. Nandakumar, Mr. M.J. John, Mr. C.G. Thomas and Mr. C.N Chandrasekharan, Mr. Saiju Varghese for their timely help during the course of this investigation. I wish to express my sincere thanks to the Prawn farmers in Ernakulam District, Tuticorin , Nellore and Guntur in AndraPradesh. My thanks are also to the staff members of Crustacean Division of CMFRI, staff members of Prawn Farming

and Marketing Section of MPEDA.

I have taken the help and co-operation of my seniors and friends whose contribution I would like to acknowleage gratefully.

To the ICAR I express my sincere thanks for providing the Junior Research Fellowship during the course of the study.

INTRODUCTION

The success of any aquaculture programme depends not only on increased production, but also on the existance of a well organised and efficient marketing system (Shang. 1990). Fish has been a major source of animal protein with ever increasing demand. Capture fisheries have so far been the mainstay of fish production. But production from capture fisheries becomes more or less stagnant in several areas on account of exploitation reaching the maximum sustainable level or due to over exploitation. (Sukumaran. 1992). Therefore more and more attention is now being given to fish production through aquaculture. Prawns are the single item in the basket of aquaculture products which accounts for more than 70% of the export earning from marine products. (Das 1991, Krishnan et al 1991, Umadevi et al 1993).

Universal taste, high unit value, short duration of crop, quick return on investment, persistent demand and fast expanding world market are the major attraction to take up shrimp culture in coastal inlets. According to the nature of the scientific management and inputs shrimp farming can be broadly classifed as traditional, extensive, semi-intensive and intensive (Muthu, 1980, Santhana Krishnan, 1992, Pillai, 1990). At present, over 50 countries undertake shrimp farming on commercial scale and producing an estimated quantity of about 7.3 lakh tonnes per annum (1990 - 92). Farm raised shrimp accounted for 2.1% of the total prawn catch of the world in 1981 which rose to 26% during 1989 and to 28% during 1991-92 (Pillai, 1993). At present about 84% of the global aquaculture production comes from the Asian Region (Rhodes, 1993, Kungvankij (1985), Alagarswami (1990).

India has remained the leading shrimp producing and exporting country in the world till recently, but due to the intensive adoption of culture technology by a few south east Asian countries India has been pushed back to the fifth position (Santhana Krishnan, 1986).

Aquaculture production and marketing are very closely inter-linked. Efficient marketing alongwith sufficient infrastructure facilities to handle the products without perishability can ensure the sustenance of aquaculture production in the long run.(Chidambaram 1988). Amongst other marketing factors, role of intermediaries, share of producer in consumer rupee and marketing expenses in each distribution channel are the major determinants which decide the ultimate profitability of any aquaculture project. (Gupta, 1985). The rather low level of production from traditional culture is increasingly attracting fish farmers to extensive and semi-intensive farming, both of which require higher capital inputs and all farmers are not solvent enough to take up these methods, the aquaculture operation we have to continue at all three levels. (Shetty, 1992). Due to the increasing demand of prawns in export market, extensive culture practices have given way to semi-intensive or intensive systems in many parts of the country (Nasser, 1992).

Aquaculture plays a key role in bridging the yawning gap between the supply and demand in animal protein, in providing employment opportunities, international trade and in improving the co-operation among the developed and developing countries. The contribution of the fisheries to the total exports from India is about 4% (Jakhar 1993).

Due to the declining trend of prawn catch from the sea, brackish-water prawn farming has immense scope to enhance shrimp production to meet the gap and to increase India's foreign exchange. India is one of the few countries in the world with rich natural resources for aquaculture.

The details regarding production and economics of the traditional culture systems were studied by George (1974,1980) Gopalan et al.,1980, Purushan (1987), Sathiadhas et al (1989), Ajith Kumar (1990), Jayagopal (1991), Nasser and Noble (1992). Shrimp farming has undergone rapid change from the age old traditional shrimp filteration practices to the highly advanced scientific farming with high production rates. Now India ranks fifth among the countries producing shrimp through aquaculture in the world, with an estimated annual production of about 45,000 tonnes from 70, 000 ha. (1992) with a unit production of about 643 kg/ha. (Rosenberry, 1993).

Marketing is an important aspect of aquaculture. But adequate attention was not given to this field till recently. However, in recent years few works are being done in the marketing aspects of fishery products. Bostock et al, (1992) have studied the production and marketing of Anchovies in Kanyakumari District. Recently F.A.O has published a detailed account of the marketing of aquaculture products (Shaw, 1986). Kusnadi et al (1990) has analysed structure, costs and margins of the marketing systems of common carps. The studies by Manwaring and Romano (1990), Barnett and Andrews (1991), Ednoff (1992), Katiha and Chandra (1990), Ruello (1986) etc deals about the marketing problems and strategies of different aquaculture

products. However, in India, only few works have been done on the marketing of fishery products. Sathiadhas and Panikkar (1988) have made a study on marketing structure and price behaviour of marine fish in Tamilnadu. They have analysed the price spread of different commercially important fishes and determined the producer's share in consumer rupee. Saxena (1970), Srivasthava et al, (1982) has studied the price behaviour of Indian frozen shrimps in US market.

Indian Institute of Management (IIM) has conducted a detailed study both for Inland and marine fish marketing in India. (Srivasthava et al.,1984). The study stressed the need for improvement in the fish marketing system. Sribhibhada (1985), Fatima (1989), Rosenberry (1992), have analysed the present status of the world shrimp markets of Japan, USA, EEC and some Asian markets and suggested quality control, better packaging and liberalised policies for improvement in exports. Since shrimp has dominated our seafood export industry, brackishwater shrimp culture has a crucial role to meet the projected export level of Rs. 2,000 crores by 2,000 AD (Srivasthava, 1989). Internal and export marketing of freshwater prawns (Macrobrachium rosenbergii) studied by Liao D.S and Smith (1982, 1985), Sadanandan et al, (1992) indicated immense scope and potential for development. The preliminary aspects and requisitis of efficient fish marketing were given by Ramakrishnan (1980). Mud crab Scylla serrata, Pearl Spot, Milk fish, Mullets and Tilapia, are the other commercially important aquaculture products with high domestic demand.

Most of the brackishwater farmers follow prawn culture mainly

because of its demand in export market. The principle factors affecting the value of shrimp are size, quality, appealing colour and species preference. Size has always played an important role in determining prices to the producers and consumers. In the international market, WHITE (Penaeus indicus)and TIGER (Penaeus monodon)are the high demand products from aquaculture, commanding a high price. Shrimp is graded in groups of sizes, expressed as count per pound (no. of prawns per 454 gms). The headon raw materials are usually counted as different grades of count per Kg. According to Michael (1987) fish marketing is a function of a group of activities namely research, public advertising and sales promotion, designed to move a product from the fish farmer to the final consumer. Quality, quantity and supply regularity are the demanding criteria to be met in any marketing system.

As per the existing system of management the fish farmers in India, are said to be suffered by way of not getting the due price for their products. The producers deserve a legitimate share in the consumer rupee. Japan, Western Europe & USA, are still continuing as the major consumers of aquaculture products (Nambiar, 1990, Halga and Franssu, 1992, Filose, 1992, Fatima, 1990 and 1992; Franssu, 1992, Sukumaran, 1992, Kano 1990, Blake 1992, Ikeda 1992, Jamieson 1993). The perishable nature of prawns and fishes, seasonality of its production and the long distance between the producer and the consumer markets are some of the important factors which require attention while assessing the marketing channels of fishery products. Sathiadhas, (1988) has emphasised the needs for proper grading,

weighing and quality control in fish marketing system. As the marketing functions like pooling, sorting, packing, transportation and freight to consumers located at well spreadout far off foreign markets become important, the forms of marketing channels become more complex (Srivastava, 1985).

Apart from shrimps, there are many other items like pearls, lobsters (Rao, 1985, Radhakrishnan 1993, Sarvaiya 1987), edible molluscs, seaweeds, crabs and finfishes which hold high export potential requiring further product diversification to increase our exports. Meanwhile our domestic market for the shrimp products have not yet been adequately developed.

Chidambaram (1975) has emphasized the need to make consumer packs of prawn products because at present Indian frozen shrimps are packed and exported in 5 lb or 2 kg blocks. These are normally the industrial or institutional packs which are just raw materials for reprocessing and repacking, from the Western Europe markets. Among the frozen shrimps, both block frozen products and Individual Quick frozen products (IQF) are exported in either of the following forms. (a) Headon (b) Headless-shellon (HL), (c) Peeled and deveined (PD), (d) Peeled and undeveined (PUD), and (e) Cooked and Frozen products. Shrimp grades are classifed based on their individual weights and number of prawns per 454 gms (1 pound) and this is the usual grading methods in the international markets.

Due to the high demand of prawns in the export market, about 95% of the aquaculture shrimps in India are processed and exported

to about 70 foreign countries. Only 5% of the brackishwater aquaculture prawns, which are mainly of small size and uneconomic species, are reaching the domestic market. These small varieties of prawns fetches hardly 25% of the actual export unit price. The domestic marketing of aquaculture products consists of small crabs and some finfishes like Mullets, Pearl spot,Milk fish,tilapia etc. Swamy, (1991) has stated that the demand for fishery products in the developed countries is fast expanding because of health consideration, but the demand for prawns in the domestic markets of developing countries are not much attractive as middle class people are not affordable to purchase prawns due to its high prices. Sathiadhas (1991) has stated that the price behaviour of fish in the internal market is mainly characterised by wide fluctuations at all stages of transactions due to the high variation in its short run supply.

In the domestic marketing system of aquaculture products, the supply of fish and prawns to interior places is highly restricted. The per capita consumption of fish in a coastal belt of 16 km is nine times that of for the whole country (Govindan, 1976). The cultured finfishes are reaching the nearby local markets through intermediaries. Regarding fish marketing there has been no regulation even in major markets which usually helps only the middlemen (Sathiadhas, 1991). The domestic market will always provide sufficient cushion to the industry whenever there is a set back in the export market. At present our domestic markets are not yet adequately developed for the frozen prawn products (Chidambaram, 1975).

Packaging plays a very important role in preserving the quality of the aquaculture products. An attractive,appealing,eye-pleasing packaging plays a very vital role in sales of the products. Some times even though the quality of the product is high, seafood loose the market due to poor packing (Gautam, 1993). To exporters packaging is a means of ensuring the delivery of the product in good condition to end users at minimum overall cost. To consumers, the package is the product. Factors which need to be taken into account during the selection process include adequate protection of the product, availability of the packaging material, ease of packaging operation, suitability of the pack for long distance transport and display features of the pack (Sirilak, 1989).

Ram Varma (1993) has stated that diversified and value added products like IQF can achieve a major breakthrough in the international market. At present India is exporting value added products like headless shrimp (HL), PD & PUD (Gopakumar, 1993). The mud crab, Scylla serata has always been a popular item among seafood lovers. There is a flourishing international trade in these live crustacean in some southeast Asian countries like Singapore, Malaysia, Hong Kong, and Japan. Crab fattening is a recently evolved profitable method of short term aquaculture to meet the demand of the top quality 'mud' variety of crabs.

Depending on the time taken in transport, the fishery products are suitably iced, packed in insulated containers and transported.

Krishna Rao (1986) has worked out the unit cost of air transport of fresh fish to distant domestic markets and stated that the major areas of concentration are the use of less expensive containers and application of less quantities of ice. Shrimp is probably the species with most potential for the development of a value added industry in developing countries (Josupeit, 1992).

Since the sustenance and success of growing aquaculture industry in India is highly depending on the ever expanding international competitive market, the present study was carried out with the following objectives.

(1) To review the overall production and marketing trend of aquaculture products.

(2) To identify the different marketing channels and to analyse the comparative marketing expenses and marketing margins of aquaculture products.

(3) To carry out a comprehensive study on price spread for commercially important varieties of cultured shrimps and to estimate the share of producers and intermediaries in consumer's rupee.

(4) To find out the inter-relationship between prices at different levels of the marketing system.

MATERIALS AND METHODS

Aquaculture technology and its marketing differs from region to region. Different farmers follow either of the traditional or scientific method of aquaculture and they market the products through different marketing channels according to their convenience and preference. At present Kerala alone contributes to about 20% of the total area under brackish water aquaculture and produces about 24% of the quantity. However, this contribution is mainly from the traditional prawn filteration practices, mostly distributed in Ernakulam District although some extensive farms have also come up recently. The present study on marketing channels were based on the information collected from various types of farms under seasonal, perennial, extensive and semi-intensive systems. The prawn farms were classified into the above four categories based on 12 different parameters as given in Appendix-A.

AREA AND COVERAGE OF STUDY

As the seasonal farms have the most diversified complex marketing channels, 20 seasonal farms and 10 perennial farms were randomly selected representing different coastal villages of Ernakulam District. Ten extensive farms were selected from various representative regions like Kannamaly and Chellanam. Data were also collected from Ten commercial semi-intensive farms of Nellore and Guntur in Andhra Pradesh and Tuticorin in Tamilnadu. Information from 20 intermediaries representing peeling shed agents, pre-processing centres, commission Agents, Pre-harvest contractors etc., has also been collected. Ten processing centres and ten exporting units were selected from Cochin

region. Ten local markets in Ernakulam District such as Kaloor, Thevàra, Edapally, Ernakulam, North Paravoor, Narakkal, Kalamessery, Aluva, Angamaly and Perumbavoor were also selected to collect information on domestic marketing.

D A T A C O L L E C T I O N

Secondary data regarding total marine products exports and contribution of capture and culture fisheries in total production were collected from the reports of MPEDA and CMFRI.

Primary data were collected from 100 samples representing producers, marketing intermediaries and consumers at different stages of export and domestic marketing channels. Three types of schedules were prepared, pre-tested and used for data collection regarding price, transportation cost and other marketing expenses of aquaculture products at various points of different identified marketing channels.

Schedule-I: This schedule was common for all type of prawn farming practices to gather information from the producers. It provided information about the type of farming cost of inputs, production details, prevalent marketing channels and price received for each specific count of the raw materials (Appendix-B).

Schedule-II: It was specific to collect information on marketing costs from pre-proccessing centres, peeling-shed agents, commission agents, wholesalers and other intermediaries who are involved in the marketing of aquaculture products. Data on marketing expenses of different grades of raw material, semi-processed products, peeling charges and transportation, are collected through this schedule, (Appendix-C)

Schedule-III: This was used to collect data from the processing centres and export units to get information regarding the price at different levels of processing and exports. It also provides information on the processing and marketing costs of exporters (Appendix-D).

In the international markets, traders use various trade names instead of the scientific and local names. The following are some of the trade names of commercially important prawns exported from India.

TRADE NAMES OF COMMERCIALLY IMPORTANT PRAWNS

Sl. No.	POPULAR/COMMON NAME	SCIENTIFIC NAME	TRADE NAME
1.	Indian White Prawn	Penaeus indicus	WHITE
2.	Jumbo Tiger Prawn	Penaeus monodon	TIGER
3.	Green Tiger Prawn	Penaeus semisulcatus	FLOWER
4.	Banana Prawn	Penaeus merguensis	BANANA
5.	Flower Tail Shrimp	Metapenaeus dobsoni	BROWN
6.	Speckled prawn	Metapenaeus monoceros	BROWN
7.	Jinga Prawn	Metapenaeus affinis	KING PRAWN
8.	Kiddi Prawn	Parapenaepsis stylifera	MARINE SHRIMP
9.	Paste shrimp	Acetes indicus	JAWALA
10.	River Prawn	Macrobrachium rosenbergii	SCAMPI

ABBREVATIONS AND TRADE TERMS IN EXPORT MARKETING

1.	HL	Headless-shell on shrimp products
2.	PD	Peeled and Deveined shrimp
3.	PUD	Peeled and Undeveined shrimp
4.	BUTTERFLY	HL Shrimp with meat split open
5.	PRIME	Price Indicator of Marine Product Exports (weekly)
6.	Count/kg	Grading method for headon raw material (No./kg)
7.	Count/lb	Grading method for Headless shrimp (No./454gm)
8.	FOB	Free on Board Price
9.	CIF	Cost Including Freight Price
10.	IQF	Individual Quick Frozen Product

ANALYSIS AND INTERPRETATION

In the International market, shrimps are graded based on their size and weight. The commercial varities, WHITE and TIGER are graded into 10-12 grades based on the number of Headless tail pieces per pound. However, as aquaculture shrimps belong to a uniform medium size grade of range between 10-20 gm for WHITE and 10-30 gm of TIGER, only 6 grades of WHITE, 6 grades of TIGER and 3 grades of BROWN were selected. The price for each grade is given in US dollars per Kg. For the convenience and uniformity of the present study these rates were converted into rupees per kg based on the dollar exchange rate of August 1993. (Rs. 31.25 = 1 US$)

The aquaculture products expecially shrimps undergoes lot of changes during peeling and processing. The headon raw material is

converted into either Headless (HL) product by removing the Head (35%) or into Peeled and UnDeveined (PUD) and Peeled and Deveined (PD) products by removing Head, Shell and the gut contents (50%). At various stages of the marketing system a unit weight of shrimp undergoes considerable weight loss and corresponding price increase. To maintain uniformity in prices the "would be" prices of the raw materials without change of form were worked out and presented throughout the analysis. (Table 1)

Prawns from scientific farms belongs to almost uniform size where as the prawns from traditional ponds are a mixture of different species and various size grades of the same species.

Export quality prawns are graded based on their size, weight and quality. An inter-relation between the number of culture days, weight of individual shrimp (White and Tiger) their corresponding price and grade was prepared for the present study. The grading system of the raw material (Number of prawns per kilogram) were maintained throughout the study.

Domestic market products were graded into 2-3 groups based on their size. Finfishes like Etroplus, mullets, Tilapia and Milkfish were graded into more than 2 categories and other finfishes were listed as single miscellaneous variety.

Further an enquiry into the marketing of value added products of prawns and other aquaculture products like live crab export, edible oyster and pearl oyster which are gaining importance in recent years, are also been included in the present study.

Suitable econometric and statistical tools were used in the analysis of data.

(I) The gross marketing margin and share of producer in consumer rupee and share of intermediaries were worked out by using the following formulae

(a) Gross marketing margin (GM) = $CP - PP$

(b) % of marketing margin = $\frac{CP - PP}{CP} \times 100$

(c) % share of producer in consumer rupee = $\frac{PP}{CP} \times 100$

(d) % of pre-processors margin = $\frac{PPP - PP}{CP} \times 100$

(e) % of processors margin = $\frac{PRP - PPP}{CP} \times 100$

(f) % of exporters margin = $\frac{EXP - PRP}{CP} \times 100$

where

CP - Consumer Price

PP - Producer's Price

PPP - Pre-processors Price

PRP - Processors Price

EXP - Exporter's Price

(II) For calculating the weighted average price of the raw material from the price of the processed products and waste, the following simple mathematical relationship was applied.

$$Pwi = \frac{PHL \times WHL + PHW \times WHW}{WHL + WHW}$$

where

Pwi - Weighted average price of raw material

PHL - Price of Headless shrimp

PHW - Price of Head waste

WHL - Weight for Headless shrimp

WHW - Weight for Head waste

i - Channel numbers 1-5

All the varieties of aquaculture products covered under the present study were divided into 2 main categories (a) Prawns and live crabs moving in the export marketing channel and (b) Finfishes and small crabs moving in the domestic marketing channel.

T A B L E. I

CONVERSION TABLE (Headon Raw Material to Headless Product)

Headon wt shrimp (gm)	Headon grade Count/kg	Headless wt/shrimp (gm)	Headless grade Count/lb)	Yield Factor	Producer Price (Rs./kg)	CIF price HL Product (Rs./kg)
WHITE						
20-25	40-50	13-17	26-30	.68	180	312
15-20	50-60	10-13	31-40	.67	160	285
12-15	60-80	8-10	41-50	.66	140	234
10-12	80-100	6-8	51-60	.65	120	204
8-10	100-120	5-6	61-70	.64	100	175
7-8	120-140	4-5	71-90	.63	80	145
TIGER						
25-30	20-30	24-34	26-20	.70	260	400
20-25	30-40	17-24	21-25	.69	220	334
15-20	40-50	13-17	26-30	.68	190	290
12-15	50-60	10-13	31-40	.67	160	250
10-12	60-80	8-10	41-50	.66	120	220
8-10	80-100	6-8	51-60	.65	100	180
BROWN						PUD PRODUCT
5-10	100-200	2.5-5.0	100-200	.5	50	80
3-5	200-300	1.5-2.5	200-300	.5	40	60
2-3	300-500	1-1.5	300-500	.5	30	50

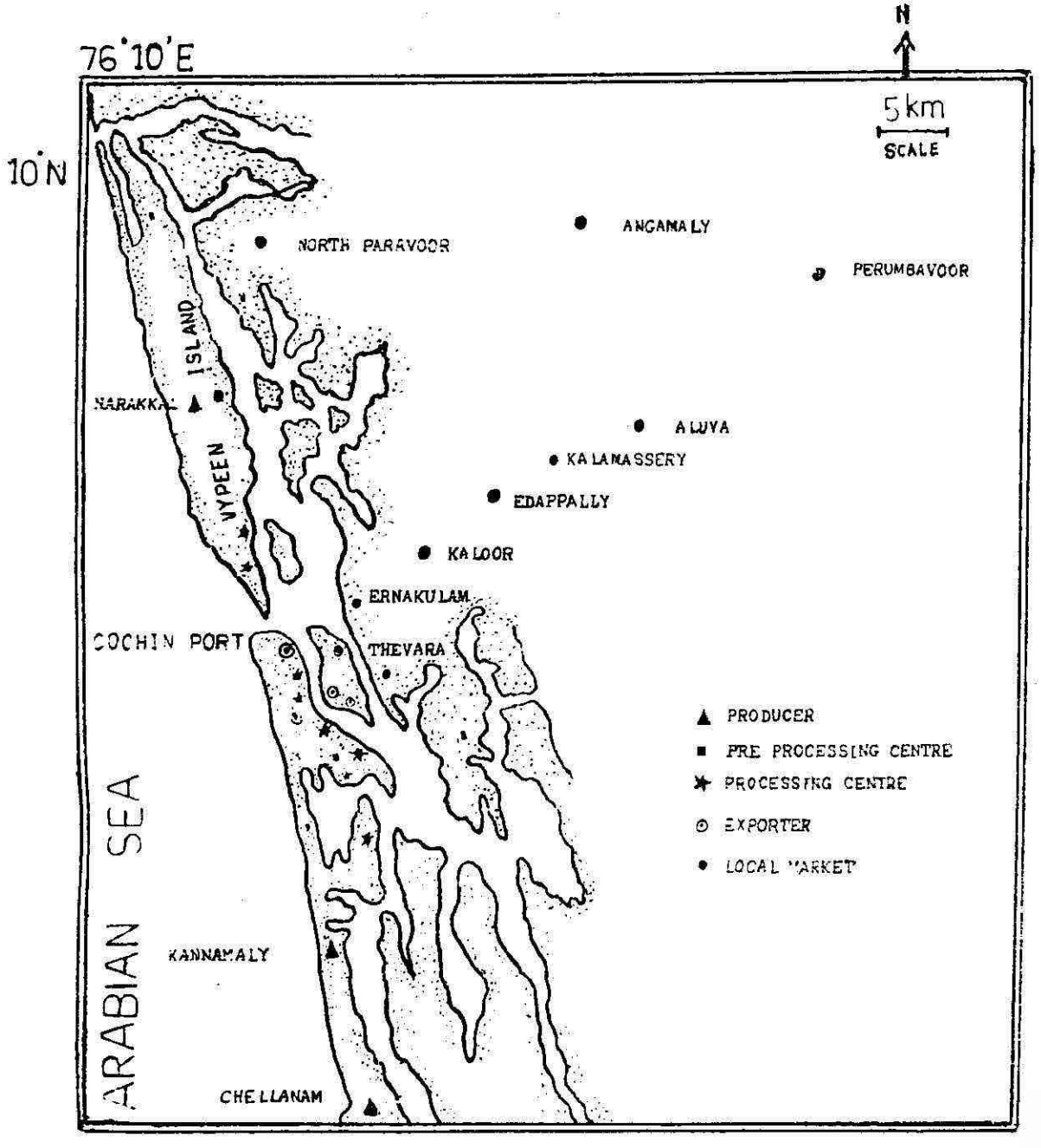


FIG .1

MAP SHOWING AREA OF SURVEY - ERNAKULAM DISTRICT

RESULTS AND DISCUSSION

Production and Marketing of Aquaculture Products - an overview

Marketing structure explains the over all distribution pattern of all varieties of aquaculture products and the role of each agency involved in the movement of the product. The flow of aquaculture products can be broadly divided into two categories depending on the ultimate destination of the product. High unit value products like prawns are reaching the export market and the low unit value products like finishes and small crabs reach the domestic market.

Aquaculture shrimps contribute only 13-15% of the total shrimp production. But its exact contribution to our prawn exports is yet to be well established. This is mainly because of the gradual mixing of capture and culture prawns at various stages of the marketing system. The present growth rates of total marine products and contribution of shrimps are listed in Table 2. During the last 20 years our total marine product export has increased nearly 6 times from 35,523 tonnes (1971-72) to 2,08,602 tonnes (1992-93). In terms of value, it was only 44.5 crores in 1971 and it has increased to 40 times in the current financial year (1767.63 crores). The average unit value has also increased almost 7 times from just 12.54/Kg. to Rs. 84.72/Kg. Till 1991, shrimps contributed a share of 70-80% of the total foreign exchange earning from marine products of value and 50-60% in terms of quantity. However a major noticable change in 1992-93 is that shrimps contributed to only about 35% of the quantity and 66% in value. This is mainly

TABLE : 2

EXPORT OF INDIAN MARINE PRODUCTS AND SHRIMP PRODUCTS (1971-72 -- 1992-93

Year	TOTAL MARINE PRODUCTS EXPORTS			SHRIMP EXPORTS			% share of shrimps (value)
	Quantity (tonnes)	Value (crores)	Unit Value Rs/Kg)	Quantity (tonnes)	Value (crores)	Unit value (Rs/kg)	
1971-72	35,823	44.55	12.54	23181	31.34	13.52	70
1972-73	38,903	59.72	15.35	30550	50.88	16.65	84
1973-74	52,279	89.51	17.12	35895	65.81	18.33	73
1974-75	45,099	68.41	15.17	34361	63.73	18.54	83
1975-76	54,463	124.53	22.86	46831	94.34	20.14	75
1976-77	66,750	189.12	28.33	47952	160.64	33.50	84
1977-78	65,967	180.95	27.43	47239	156.22	33.07	86
1978-79	86,894	234.62	27.00	51223	179.06	34.96	76
1979-80	86,401	248.82	28.80	53511	223.13	41.70	89
1980-81	75595	234.84	31.07	51358	201.78	49.19	86
1981-82	70,105	286.01	40.80	52180	247.94	62.37	86
1982-83	78,175	361.36	46.22	55002	316.15	66.49	87
1983-84	92,691	373.02	40.24	54444	314.81	66.10	84
1984-85	86,187	384.29	44.59	55398	329.69	71.23	86
1985-86	83,651	398.00	47.58	50349	329.81	74.23	83
1986-87	85,843	460.67	53.66	49203	377.93	76.81	82
1987-88	97,179	531.20	54.66	55736	425.78	76.39	80
1988.89	99,777	597.85	59.92	56835	470.33	82.75	79
1989-90	110,843	634.99	57.29	57819	463.31	80.13	73
1990-91	139,419	893.37	64.08	62395	663.33	106.31	74
1991-92	171,820	1375.80	80.08	76151	979.12	128.58	71
1992-93	208,602	1767.43	84.72	74393	1180.26	158.65	66

Source - MPEDA.

because of slight rediction in quantity of prawns exported along with substantial increase in the quantity of selected varieties of finfish and reasonable increase in cuttlefish and squids. However shrimps are having a higher unit value of about Rs.158/Kg. and total marine products are having only about Rs. 84/Kg.

In 1981, India exported 52,180 tonnes of shrimp valuing Rs.247.94 crores and it has increased to 74,393 tonnes valuing Rs.1180.26 crores in 1992-93 (Table 3). During the last 10 years our shrimp export has increased only less than half times in quantity and 3.75 times in terms of value.

Shrimp production from marine sector has almost doubled from 1.45 lakh tonnes during 1981-82 to 2.73 lakh tonnes during 1992-93 and aquaculture production during the same period has increased more than 3 times from 13,000 tonnes to 45,000 tonnes. In other words the total shrimp production of our country has more than doubled (1.58 lakh tonnes to 3.27 lakh tonnes) during the last decade. But this increase in production has not been reflected in our shrimp exports. It appears that the intensive shrimp trawling during the last few years in our coastal waters has not led to any increase in our export.

Capture and culture production are the sources of raw material for our shrimp export. Out of the total shrimp production major share is contributed by the marine sector (85% of quantity). Our total shrimp production in 1992-93 was 3,27,374 tonnes of which about 2,77,374 tonnes are contributed by capture fisheries

TABLE : 3

CAPTURE AND CULTURE PRAWN FISHERIES PRODUCTION AND EXPORT TREND (1981-82 - 1992-93)

Year	SHRIMP PRODUCTION			SHRIMP EXPORT		
	Capture (tonnes)	Aquaculture (tonnes)	Total (tonnes)	Quantity (tonnes) PROCESSED	Quantity (tonnes) PREPROCESSED	% to Export
1981-82	1,44,969	13,000	1,57,969	52,180	86666	55
1982-83	1,61,945	13,500	1,75,445	55,002	91670	52
1983-84	1,66,953	14,000	2,06,953	54,444	90740	44
1984-85	1,92,012	15,000	2,07,012	55,398	92330	45
1985-86	1,89,042	16,700	2,56,042	50,349	83918	33
1986-87	2,10,616	18,400	2,29,016	49,203	82005	36
1987-88	1,90,866	22,000	2,12,866	55,736	92893	45
1988-89	2,02,151	23,500	2,25,151	56,835	94725	43
1989-90	2,23,087	25,000	2,48,087	57,819	96365	39
1990-91	2,44,353	30,000	2,74,353	62,395	103992	38
1991-92	2,95,000	35,000	3,30,000	76,151	126918	38
1992-93	2,77,374	45,000	3,27,374	74,393	123988	38

Source - MPEDA - Export Review (1981-93)
- CMFRI - Research Highlights (1981-93)

and 45,000 tonnes by aquaculture. A detailed analysis indicates that during 1992-93 only about 23% of the total shrimp production are utilized in the processed form for export marketing. This wide variation from production to export may be because of the following reasons.

(1) A quantity of 2.77 lakh tonnes is the total capture shrimp production where non-penaeids contributes to about 35%. These products are used either in the domestic market or they are dried for later consumption.

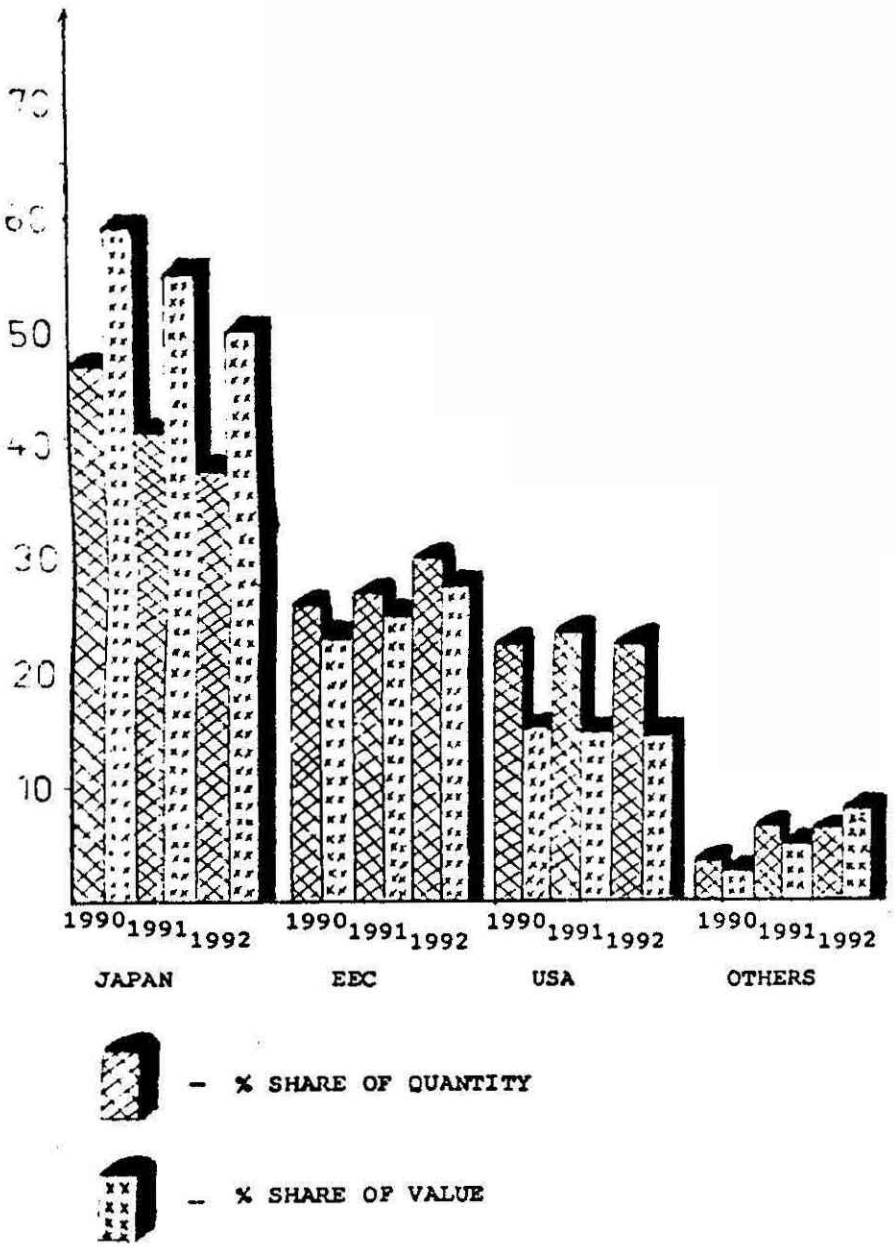
(2) Among the penaeid prawns (1.8 lakh tonnes); only 50% is utilized for export purposes due to quality problems, size preference and species demand. During 1992-93 the shrimp export from marine sector was comprised of white 20%, tiger 16%, brown 42% and Karikkadi 22%.

(3) A quantity of about 90,000 tonnes of export quality penaeid prawns from marine sector is further processed into various products like HL, PUD and PD. White and tiger are usually converted into HL product with a meat yield of about 65% and brown varieties are processed into PUD with a meat yield of about 50%. A meat yield of average 55% gives a processed quantity of about 50,000 tonnes for export.

(4) This 50,000 tonnes from capture fisheries contributes to about 67% of our total shrimp exports. On the average only 38% of our total shrimp production is reaching the export market.

FIG. 2

PERCENTAGE SHARE OF MAJOR MARKETS FOR INDIAN PRAWNS



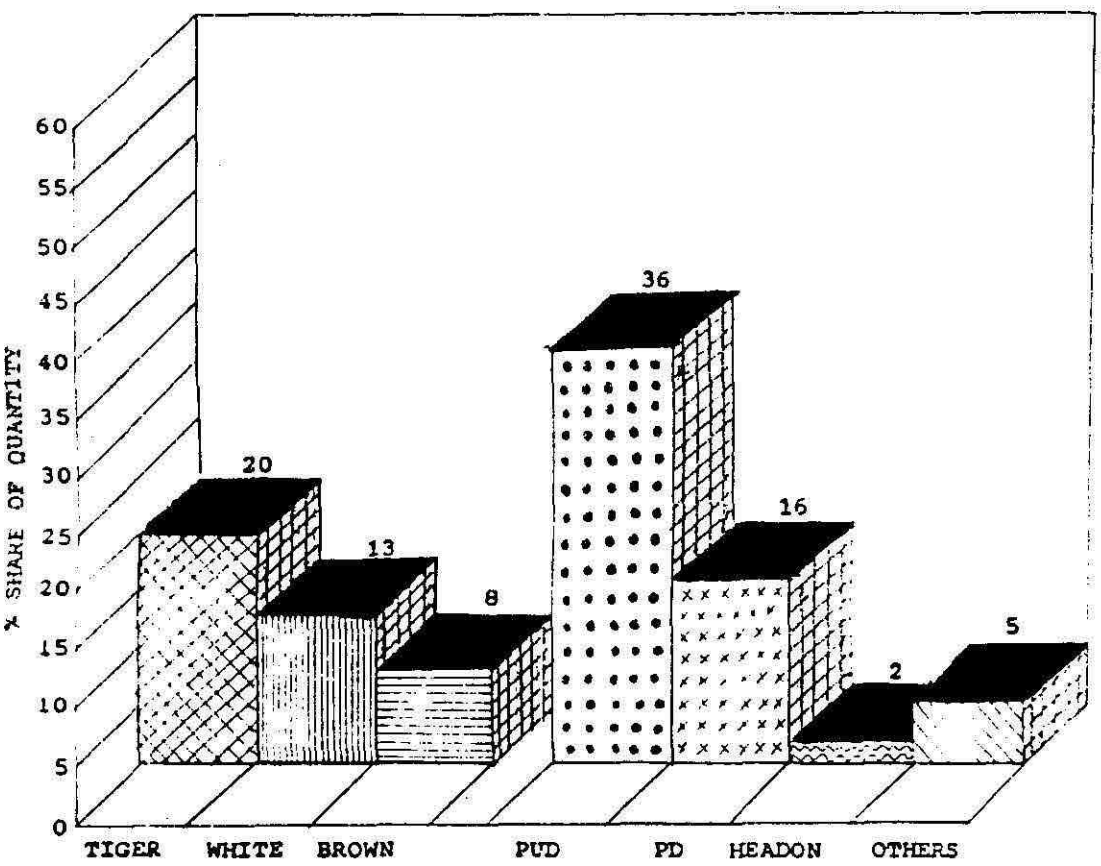
However a revised study on species - wise and size-wise shrimp production from all maritime states is essential to explain the continuously widening gap between shrimp production and export. Eventhough our capture and culture shrimp production has increased considerably during the past 10 years, there has been no corresponding growth in the export market.

A detailed analysis of the aquaculture products is also essential for estimating the exact share of aquaculture shrimps to export market. In 1992-93 eventhough acquaculture shrimps production was 45,000 tonnes, exact information is not available about its contribution to export market. About 70% of the production is either through traditional or extensive methods, Only 30% is contributed by semi-intensive farming. In a traditional prawn farm, the commercial varieties of white and tiger prawns contribute only a limited quantity of about 30-35% and the rest belongs to small size grades of commercially less important brown shrimps like Metapenaeus dobsoni (60%) and M.monoceros (7%). These are usually converted into PUD and PD whereas Penaeus indicus and P. monodon are converted into headless products, which fetch almost 3 times higher unit value.

Prawns from all types of seasonal, perennial, extensive and semi-intensive farms are reaching directly or indirectly to the processing centres or export units, from where it is exported to major foreign markets like Japan, Westerm Europe, and U.S.A. The share of Indian prawns exported to these markets for the last 3 years are given in figure-2.

FIG. 3

MAJOR ITEMS OF SHRIMP EXPORT



In recent years the quantity exported to Japan market is showing a declining trend whereas the Western Europe market shows a slight increase and U.S.A remains more or less constant. The increase in the exports to Western Europe is mainly due to the increased demand from various members of the European Economic Communities like Netherland, Spain, Italy and United Kingdom. During 1992 about 38% of the shrimps valuing about 50% were exported to Japan. However this share is less in value when compared to the previous years. Till 1991 Japan imported about 40-50% of the Indian shrimps, and value ranged from 55-60%. In recent years the share of other markets like South East Asian countries are also improving.

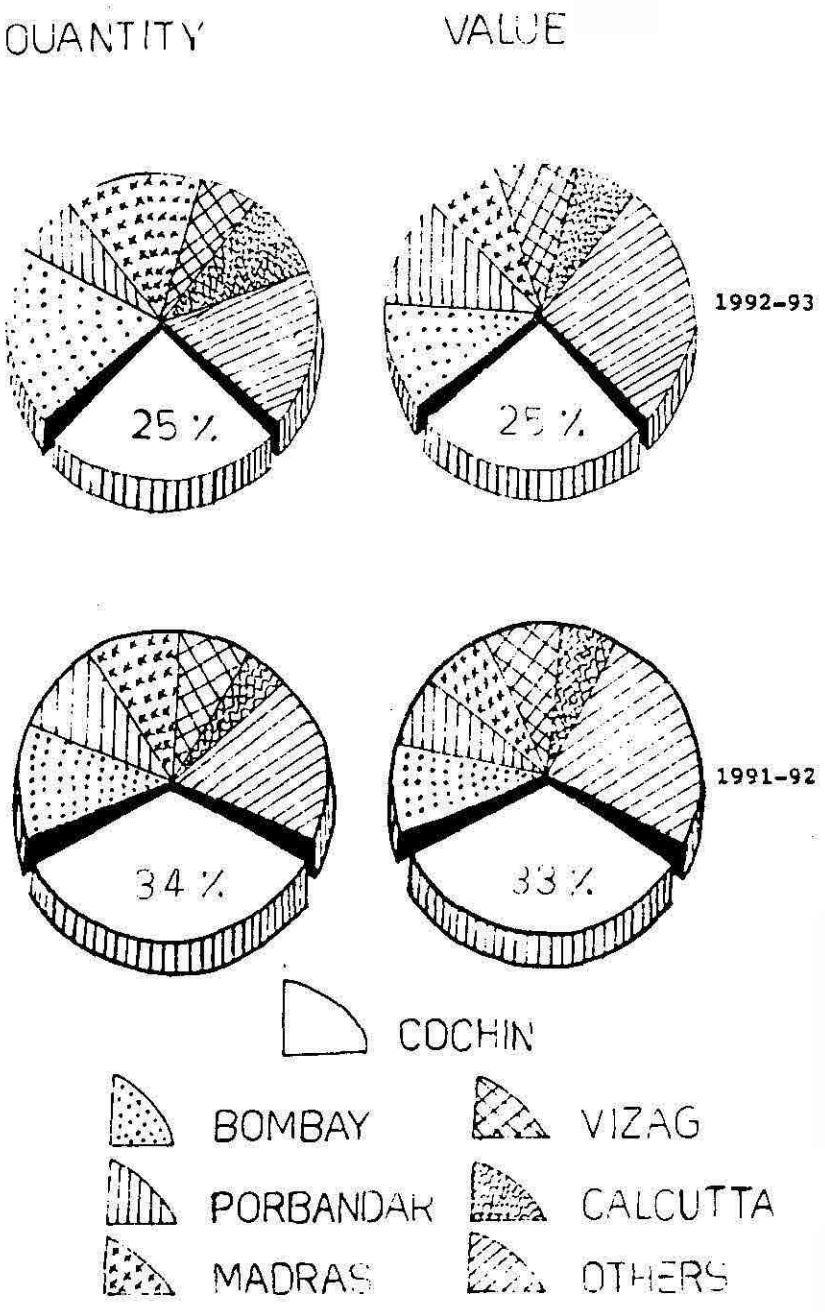
About 50-55% of our frozen exports are contributed by low graded products like PD & PUD whereas the high unit value products like headless contributes only 40% and whole head on contributes to only 2% (Fig.3). As the major share of the quantity is constituted by low priced products, each year India could not take full advantage of its potential foreign earnings from marine products.

Indian aquaculture products are exported through six major ports like Cochin, Bombay, Madras, Porbender, Calcutta and Visag. The percentage distribution of Port-wise export of the Marine Products are given in Fig.4. During 1991-92 Cochin Port exported about 34% of the quantity and value followed by Bombay 15%, Madras 10%, and Porbendar 5%. During 1992-93 there was a decline in the share of Cochin Port to about 25% of the quantity and value. This is mainly because of the labour problems in Cochin Port and also the sudden

FIG. 4

PERCENTAGE SHARE OF COCHIN PORT

IN PORT WISE EXPORT OF MARINE PRODUCTS



increase in aquaculture production from Andrapradesh and Tamilnadu. The facilities in other ports have also improved considerably during the last 5 years.

A comparison between the production and marketing among the traditional ponds of Vypeen, extensive farms of Chellanam and Kannamaly and semi-intensive farms of Nellore, Guntur and Tuticorin shows that the average production per hectare from the 20 Traditional farms were only 500Kg/ha. The traditional farm production is a mixture of prawns, finishes and crabs. The production from the traditional ponds shows a declining trend over the years. (George (1974) George (1980) Purushan (1987) Sathiadhas(1989) Nasser and Noble (1992). This may be due to the indiscriminate fishing in Cochin backwaters and the increased natural seed collection methods. The present study shows that out of the 500Kg of total production, about 80Kg are finfishes and 20Kg are crabs (20%) are moving into the domestic market. Finfishes receive only about Rs.15/Kg and small crabs (Scylla serrata) fetches Rs.30/Kg., Metapenaes dobdoni (Thelly), and M.monoceros (Chooden) are the dominant species (67%) among prawns and these are less preferred in the International market. This fetches hardly Rs.32-40/kg, where as the white and Tiger which constitute about 31% of the total production fetch about Rs.150-200 per Kg. So the average unit value of the total production from a traditional pond is only about Rs.45/Kg.

In terms of value white and Tiger variety contribute to 55%. If the production from these traditional ponds is of a single economic variety the total earnings can be enhanced up to Rs.66,000/-ha.

FIG. 5

RELATION BETWEEN WEIGHT, COUNT & PRICE

WHITE (Penaeus indicus)

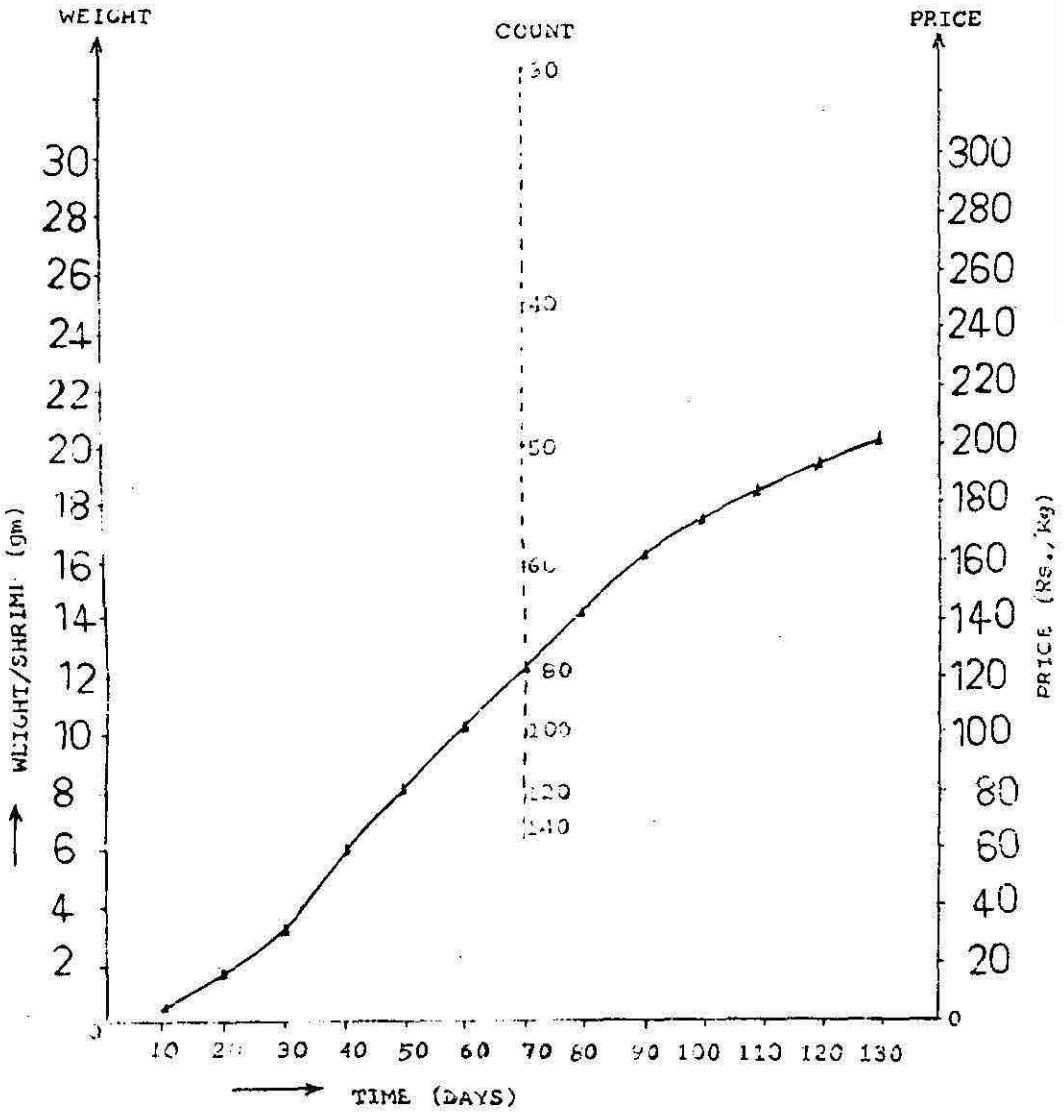
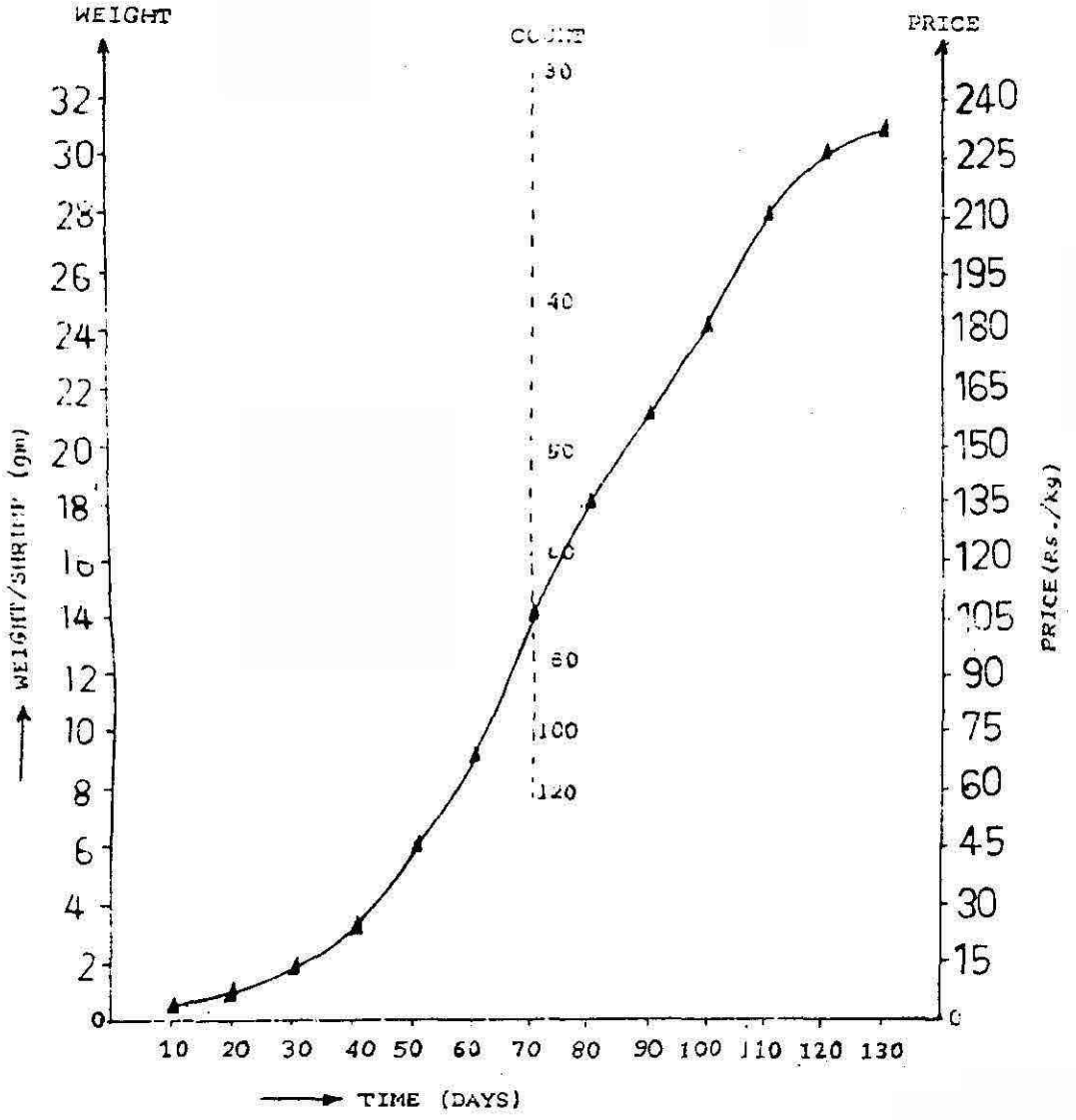


FIG. 6

RELATION BETWEEN WEIGHT, COUNT & PRICE

TIGER ([illegible])



This can be further improved by following a better marketing channel. Production and marketing from the extensive farms of Chellanam and Kannamaly involves only the export marketing system. The average production from these farms were about 1000kg/ha, comprising of either white or Tiger. This is mixture of almost uniform size grades which mainly belong to four different grades of Tiger Prawns such as 25-35 gram (60%) 20-25 (20%) 16-20 gram (60%) 12-16 gram (10%). White prawns belong to 16-20 gram (60%) 12-16 gram (20%) 10-12 gram (10%) and 8-10 gram (10%) the average price per Kilogramme of each grade of prawns can be calculated from the fig. 5 & 6. Marketing channels of production from these farms move directly to the processing centre. The producers are getting about Rs.150/kg for White and Rs.200/Kg. for Tiger.

Products from the commercial semi-intensive farms are directly reaching the processing centres. In some cases the exporter himself culture and process the products. The marketing system of commercial semi-intensive farms are the simplest and correspondingly the producers are getting the maximum price for the raw materials.

The marketing system of traditional farms are more complicated than the sceintific farms. Many middlemen and money lenders are involved in the marketing system of products form traditional ponds. Some financial assistance is highly necessary for starting the seasonal prawn culture.

The loan amount is often provided by a financer cum agent without any interest but he takes the products at a lower rate. A pre-harvest

contractor takes interest for the loan but here also an unwritten obligation falls on the farmers that the complete product should be marketed only through him. Traditional prawn faming is still profitable mainly because of less cost of production and the higher unit value of export quality prawns. The inferior quality prawns from processing centres are diverted into the domestic markets and pickle industries.

MARKETING CHANNELS

Indian aquaculture products are moving both in Export and Domestic Marketing Channels. Even though, shrimp is the major item of aquaculture, finfishes and crabs are also contributing a minor share. Production from a typical traditional pond is a mixture of prawns, finfishes and crabs whereas, production from a scientific prawn farm is exclusively of either white or tiger prawns. Finfishes and crabs move to the domestic marketing channels as they have no demand in export market. High unit value prawns move directly or indirectly to the exporting units. Based on the marketing channel studies and price behaviour, the exact difference in earnings and profitability of different prawn culture system can be highlighted.

The flow of Aquaculture products from producer to consumer on export and domestic marketing channels are given in Fig.7. Export Marketing share contributes about 80% of quantity and 95% in value earnings of a typical traditional aquaculture pond. This percentage variation is mainly because of the fact that prawns are moving to the export market and low value products such as finfishes and crabs are moving to the domestic markets. Srivastava (1984) has stated that out of the total production from traditional farms, 58% goes to the export market, 38% goes to the domestic market and 4% is dried for later consumption. However the present study reveals, that in Ernakulam District, about 80% of the aquaculture products move to the export market with 95% of the value.

FIG. 7

MARKETING CHANNELS OF AQUACULTURE PRODUCTS

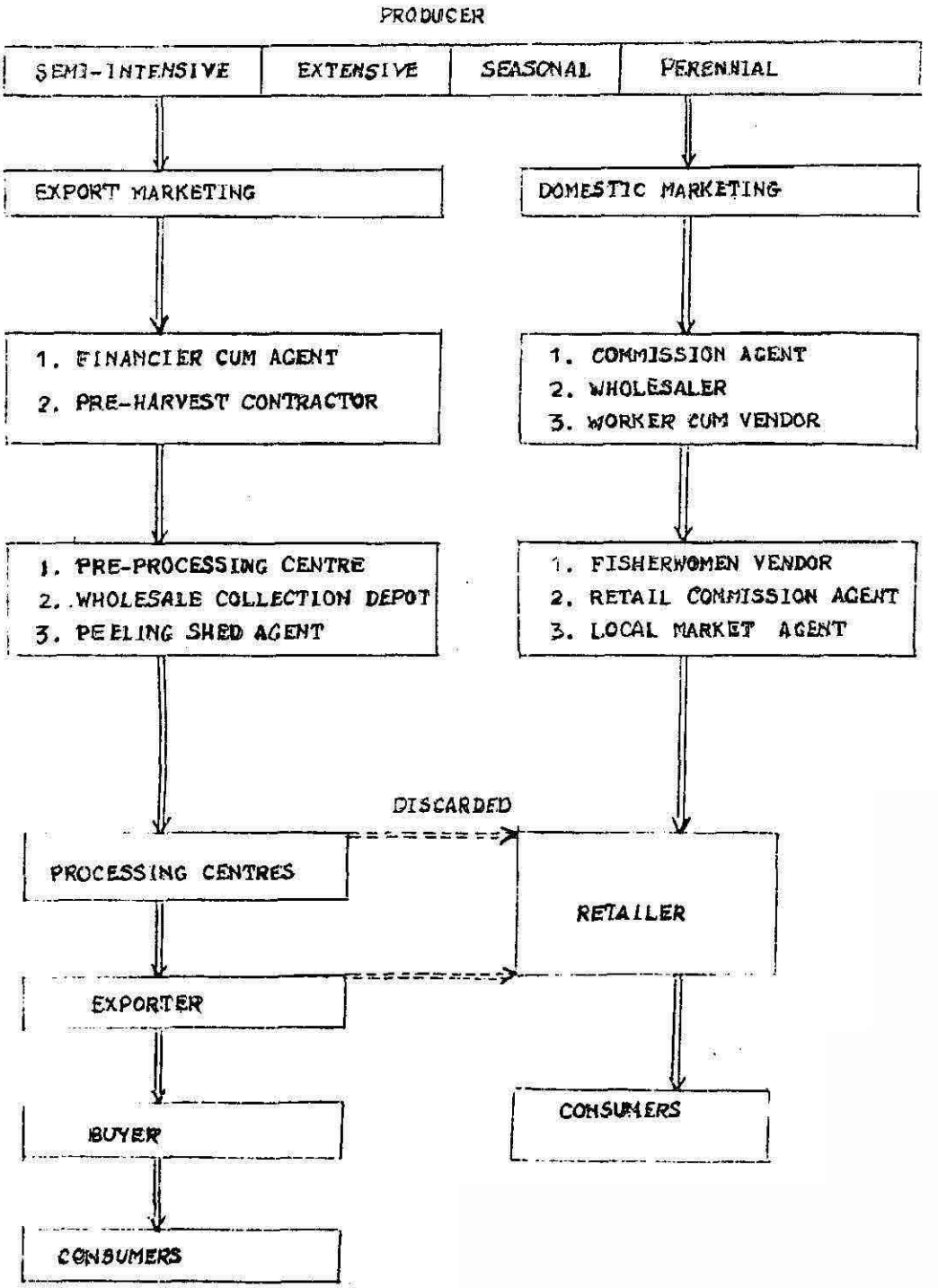
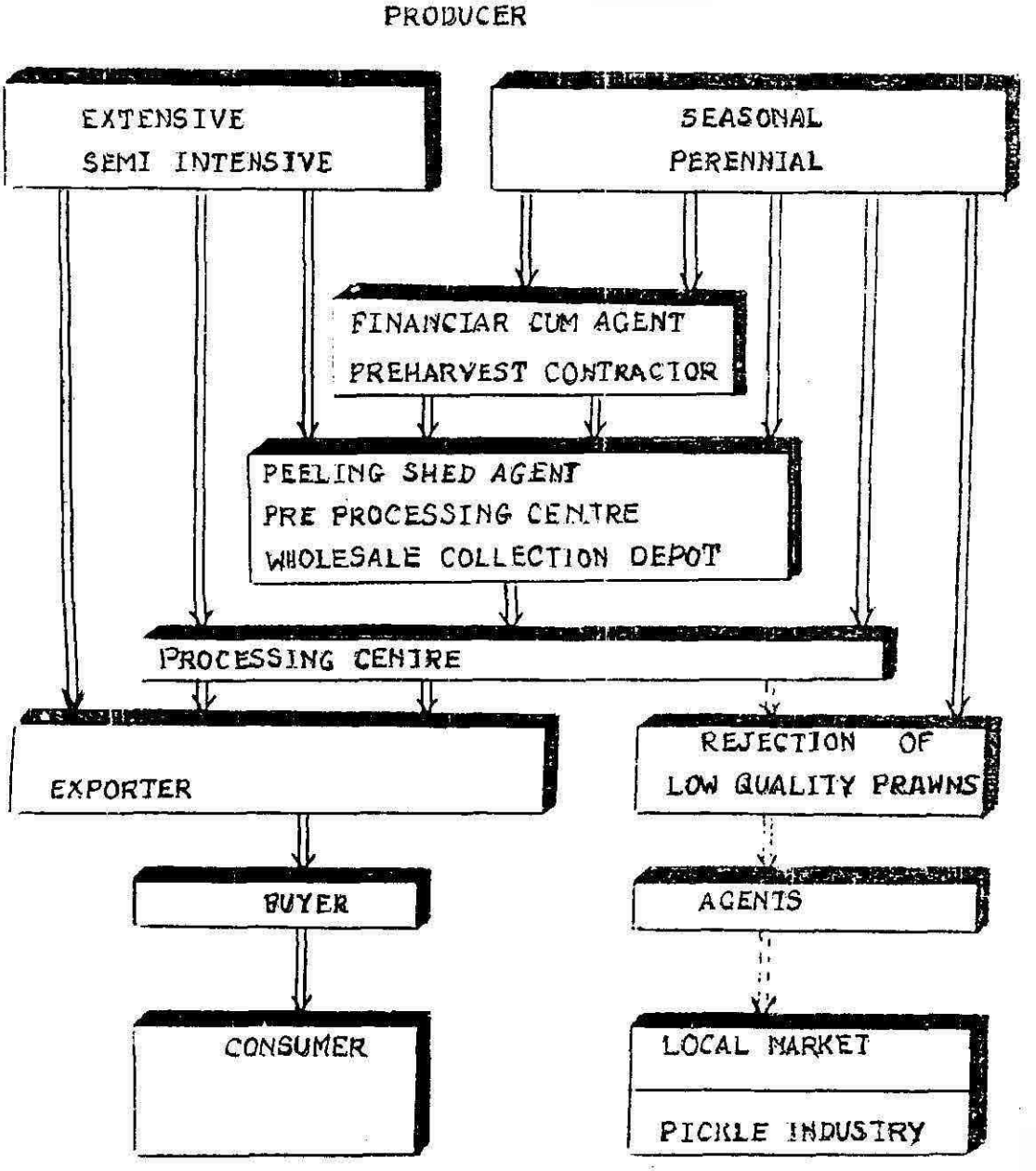


FIG. 5

EXPORT MARKETING CHANNELS



The export marketing system has 5 main marketing channels where the products passed from one to four intermediaries. The domestic marketing system can also be classified into five channels. There is considerable variation in the unit price of products moving through export and domestic marketing channels. Export marketing channels are having about five times higher unit price than the products moving through the domestic channels. There is inter-relationship between the different intermediaries involved in the marketing flow.

A. Export Marketing Channels.

Shrimps are reaching either directly or indirectly to the exporting units and sent to foreign markets like Japan, USA & Western Europe (fig.8). The marketing channels for traditional systems are much complicated than the marketing system of scientific farms. The main export marketing channels prevalent are as follows:-

1) Producer-->Financier cum Agent -->Preprocessing Centre --> Processing Centre -->Exporter -->Foreign Buyer -->Consumer.

2) Producer -->Pre-harvest contractor -->Preprocessing Centre --> Processing Centre -->Exporter --> Foreign Buyer -->Consumer.

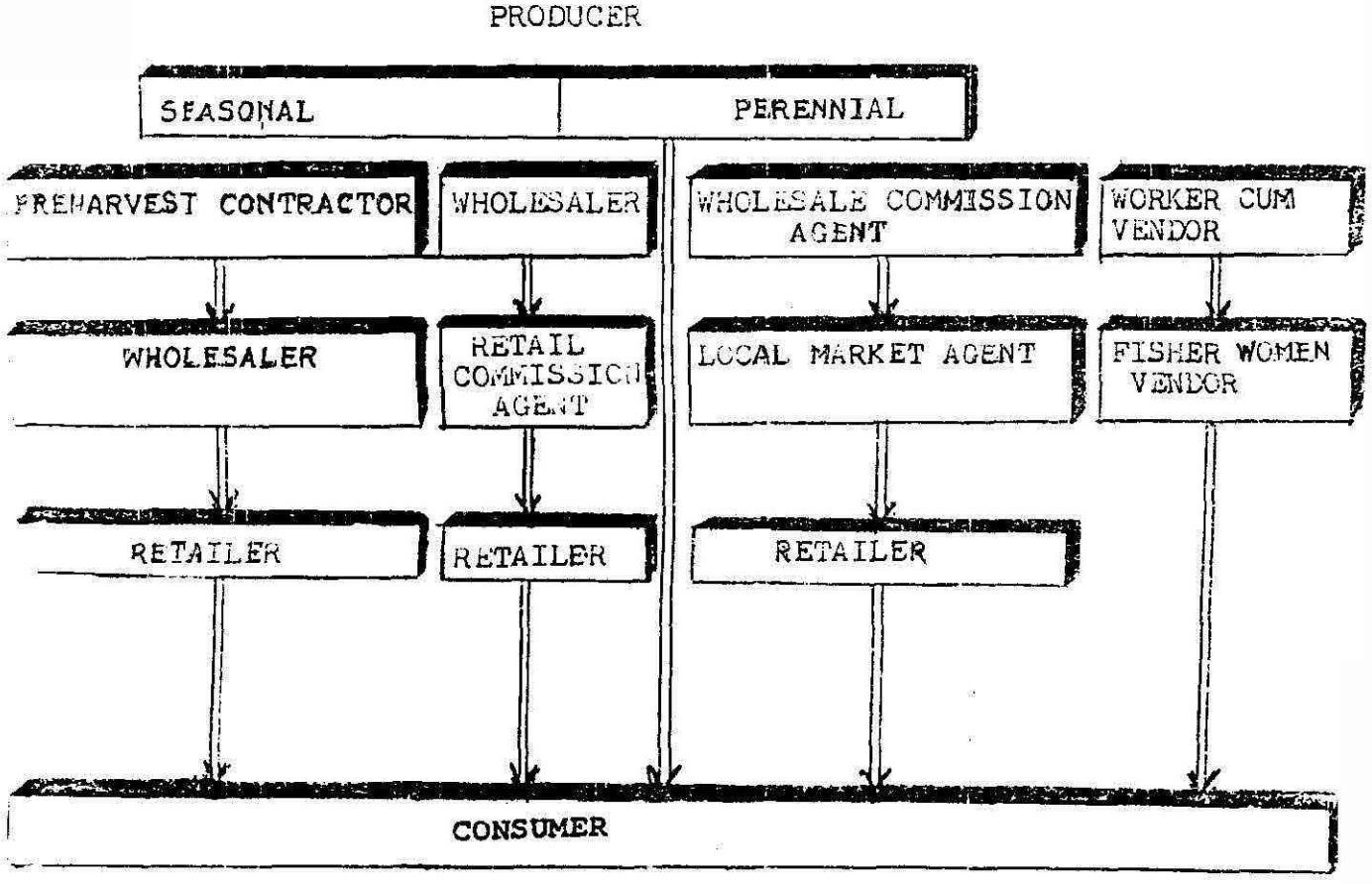
3) Producer -->Collection Depot -->Processing Centre --> Exporter -->Foreign Buyer --> Consumer.

4) Producer -->Processing Centre -->Exporter -->Foreign Buyer --> Consumer.

5) Producer -->Processor cum Exporter -->Foreign Buyer --> Consumer.

FIG.9

DOMESTIC MARKETING CHANNELS



B. Domestic Marketing Channels:

Domestic marketing items of aquaculture products are mullets, Pearlspot, tilapia, milkfishes, and small crabs. Domestic marketing pattern is applicable only for the traditional ponds because only these farm products are a mixture of different organisms. Among the shrimps, the small sized prawn varieties rarely reach the domestic market. The present study identified five types of channels in the domestic marketing (fig:9)

1. Producer --> Preharvest Contractor --> Wholesaler --> Retailer --> Consumer.
2. Producer --> Wholesaler --> Retail Commission Agents --> Retailer --> Consumers.
3. Producer --> Wholesale Commission Agents --> Local Market Agent --> Retailer --> Consumer.
4. Producer --> Worker cum Vendor --> Fisherwomen Vendor/ Retail Agent --> Consumer.
5. Producer --> Consumer.

In general, the aquaculture products in the domestic marketing system do not move long distance. About 80% of the fishes are consumed within 16 Kms. of the coastal village (Govindan (1975)). The present study reveals that about 40% of the products are sold to consumers within 10 Km of the production centres, 20% reached the nearby city or town markets, 15% handled by door-to-door fisher women vendors, 20% is consumed by the producer and labourers and about 5% reaches the nearby hotels and cold storages. The domestic fish marketing chain consists of

1 to 3 intermediaries before it reaches the ultimate consumer. Normally wholesalers and commission agents near the producing centres take the fish to markets like Edappally, Kaloor, Thevara, Kalamassery, North Parur, Aluva and Angamaly. Fisherwomen vendors are the main agents for distributing finfish and crabs in the houses of Ernakulam District. "Karimeen", (Etroplus), "Kanambu" (Mullet) and "Piloppy" (Tilapia) are the main items handled by these various agencies.

Certain portion of the aquaculture products are either consumed by the producer and his relatives or it is sold to the local consumers at a cheaper rate. Among the domestic markets Narakkal and North Paravur belong to consumer markets with in 10Km to the production site. Ernakulam, Thevara, Kaloor and Edappally markets are with in 20 Km to Vypeen Island. Aluva, Angamaly, Perumbavoor are examples of domestic markets beyond 20 Km range. Other major consumers are the cold storages & hotels of Ernakulam city. According to the convenience different intermediaries supply raw materials to the these different consumer markets (fig. 9)

Sometimes rejected, Inferior quality prawn products are reaching the domestic markets through commission agents. These are usually consumed by hotels and Pickle industries. Rarely these frozen HL and PUD products are reaching the local town markets.

PRODUCT MOVEMENT AND PRICE BEHAVIOUR

Price spread of aquaculture products can be defined as the difference between the prices received by the producer and those paid by the consumer. It includes the payment received by all intermediaries performing services in moving the product from producers to consumers. The fast movement of the products from production site to exporter ensures the quality and price of the products. Price spread is composed of margins at various levels. Unlike agriculture products aquaculture products are highly perishable and the price is directly proportional to the size and quality of the product. The price of a particular grade of shrimp is determined by the buyer in the foreign country and accordingly price is offered to the processor, preprocessor and finally to the producer. So the producer has the least role of deciding the price of the material produced by him. Gross marketing margin is the difference between the retail price paid the consumer and the price received by the producer. This gross marketing margin includes processors margine, exporter's margin, and buyer's margin. The difference between the producer price and the commission agent's price is called the collection margin or commission agent's margin.

Price spread or marketing margin are bound to increase with the proliferation of marketing agents performing the services of assembling, storage, transportation, peeling, processing, and exporting. Marketing margins will also be influenced by the degree of marketing control exercised by the government policies. An increase in price spread will soon be resulted in the rise of consumer price.

A PRICE BEHAVIOUR IN EXPORT MARKETING

Export marketing of shrimps fetches almost five times better prices than the same moving in the domestic marketing channels. In the export marketing there is a wide variation among the prices received for different size grades of the same variety as the price of the shrimp is determined by its quality and size.

TABLE 4

AVERAGE C.I.F. PRICES OF P.U.D. SHRIMPS IN MAJOR MARKETS (OCTOBER 1993)

PUD GRADE COUNT/1b	Rate (Rs./kg. Japan	USA	W. EUROPE
80-120	144	148	146
100-200	125	137	130
200-300	99	116	112
300-500	62	79	76
Broken	45	48	43

SOURCE : PRIME (MPEDA)

In Japan and USA the price for different grades PUD products ranges from Rs. 45/KG. to Rs. 148/kg. whereas in Western Europe it ranges from Rs. 43 to 146. However in general the prices offered by USA for PUD products are comparatively higher than the other markets.

TABLE 5

CIF PRICE OF HL WHITE PRAWNS IN MAJOR MARKETS (OCTOBER: 1993)

HL Grade COUNT/1b	RATE : Rs/kg		
	JAPAN	USA	W.EUROPE
16 - 20	521	434	468
21 - 25	446	400	428
26 - 30	384	343	368
31 - 35	318	309	312
36 - 41	287	259	278
41 - 50	253	225	243
51 - 60	212	184	200

SOURCE : MPEDA (PRIME)

The consumer preference for headless white prawn in Japan appears to be very nigh and they offer comparatively higher prices. The price difference for the same grade of white prawn among Japan, USA and Western Europe market are given in table 4. It is better to concentrate on Japan and Western Europe Market for our

export of the white prawns to earn more foreign exchange.

There is also considerable difference between the prices for various varieties of shrimps like tiger, white, & brown (Table 6). In the international market white is having the maximum price followed by tiger and brown. However brown varieties are composed of smaller prawns like Metapenaeus dobsoni and M. monoceros.

TABLE 6

COMPARATIVE CIF PRICES FOR DIFFERENT VARITIES OF SHRIMPS IN JAPAN MARKET (OCTOBER 1993)

GRADE	WHITE Rs/Kg	TIGER Rs/Kg	BROWN Rs/Kg
16 - 20	522	419	375
21 - 25	446	350	342
- 30	384	319	281
31 - 35	319	287	260
36 - 40	287	260	228
41 - 50	254	225	196
51 - 60	213	200	175

SOURCE : MPEDA (PRIME)

However the higher grades (16-30 count/lb) of white shrimps are rare in our aquaculture ponds. Larger tiger prawns are getting maximum price and they are abundant in the shrimp farms.

TABLE : 7 AVERAGE UNIT VALUE OF FROZEN SHRIMP VALUE IN Rs./Kg (FOB) 1988-1992.

COUNTRIES	1988	1989	1990	1991	1992
Japan	102	96	117	161	199
USA	51	55	65	75	87
W.Europe	90	86	107	90	128
Others	37	31	43	58	54

Japan is offering the maximum unit value for Indian frozen shrimps followed by Western Europe and USA (Table. 7). Most of the HL products are exported to Japan and PUD products are exported to USA. PUD products are having only 50% of the unit value of the HL products. (fig. 12 and 13) Western Europe accepts all types of shrimp products. During 1992 the average unit value of PUD products exported to USA was about Rs. 87/Kg., while the HL products exported to Japan market had Rs. 199/Kg. Western Europe offered only Rs. 128/Kg. for Indian shrimp products. However a major share of the Indian shrimps imported by EEC is agian reprocessed and repacked, and exported to consumer ccuntries like Japan and USA.

Table 8 gives the price behaviour of shrimp products while it moves from producer to consumer, passing through Financier cum agents, Feeling sheds (Preprocessing centres), Processing centres, Exporters, and Foreign buyers (Channel 1). This is the longest channel and the share of the producer is minimum. Raw material shrimps are graded as count/Kg. (No. of headon prawns/Kg) and count per pound (No.of tail pieces/454 gms) for processed HL, PUD & PD products. In the present study marketing products are classified as white (6 grades), tiger (6 grades) and brown (3 grades). The price for a particular grade of shrimp increases as it moves from the producer to the processing centres and to the consumer. The price received by the exporter includes the freight charges also (CIF rate).

The price behaviour for the three varieties of shrimps in the export market in channel 2 involving a preharvest contractor,

Table.8

PRICE BEHAVIOUR OF SHRIMPS IN EXPORT MARKETING CHANNEL 1

Headon Grade Count/Kg	Wt/prawn (gm)	Producer Price Rs./Kg.	INTERMEDIARIES					Consumer price Rs/Kg
			FCA	PSO	PC	EXP	BUY	
WHITE								
40-50	20-25	160	165	170	180	203	224	263
50-60	16-20	140	145	150	160	180	198	234
60-80	12-16	120	125	130	138	148	162	193
80-100	10-12	100	105	110	120	126	138	164
100-120	8-10	80	85	90	100	107	118	139
120-140	7-8	60	65	70	80	88	97	115
TIGER								
20-30	35-50	220	240	250	260	280	308	364
30-40	25-35	180	195	205	220	240	264	312
40-50	20-25	150	160	180	190	210	231	273
50 -60	16-20	130	140	150	160	180	198	234
60-80	12-16	100	105	110	120	140	154	182
80-100	10-12	80	85	90	100	120	132	156
BROWN								
100-200	5-10	50	53	55	57	60	66	78
200-300	3-5	40	43	45	47	50	55	65
300-500	2-3	30	33	35	37	40	44	52

FCA : Financier cum agent
PSO : Peeling shed owner
PC : Processing Centre
EXP : Exporter
BUY : Buyer

Table. 9

PRICE BEHAVIOUR OF SHRIMPS IN CHANNEL 2

(Headon Grade Count/Kg	Wt/Prawn (gm)	Producer price (Rs./Kg)	INTERMEDIARIES					Consumer price
			PHC	WCD	PC	EXP	BUY	
WHITE								
40-50	20-25	165	170	175	180	203	224	263
50-60	16-20	145	150	155	160	180	198	234
60-80	12-16	125	130	135	138	148	162	193
80-100	10-12	105	110	115	120	126	130	164
100-120	8-10	85	90	95	100	107	118	139
120-140	7-8	65	70	75	80	88	97	115
TIGER								
20-30	35-50	230	245	250	260	280	308	364
30-40	25-35	190	200	210	220	240	264	312
40-50	20-25	160	170	180	190	210	231	273
50-60	16-20	140	145	150	160	180	198	234
60-80	12-16	105	110	115	120	140	154	182
80-100	10-12	85	90	95	100	120	132	156
BROWN								
100-200	5-10	53	55	56	57	60	66	78
200-300	3-5	42	44	45	47	50	55	65
300-500	3-3	33	34	36	37	40	44	52

PHC : Prehervest contractor
WCD : Wholesale Collection Depot
PC : Processing Centre
EXP : Exporter
BUY : Buyer

Table . 10

PRICE BEHAVIOUR OF SHRIMPS IN EXPORT MARKETING CHANNEL 3

Headon Grade (Count/ Kg)	Wt/Shrimp (gm)	Producer Price (Rs./Kg)	INTERMEDIARIES				Consumer price (Rs/Kg)
			PPC	PC	EXP	BUY	
WHITE							
40-50	20-25	170	175	180	203	224	263
50-60	16-20	150	155	160	180	198	234
60-80	12-16	130	135	138	148	162	193
80-100	10-12	110	115	120	126	138	164
100-120	8-10	90	95	100	107	118	139
120-140	7-8	70	75	80	88	97	115
TIGER							
30-30	35-50	245	250	260	280	308	364
30-40	25-35	200	210	220	240	264	312
40-50	20-25	170	180	190	210	231	273
50-60	16-20	145	150	160	180	198	234
60-80	12-16	110	115	120	140	154	182
80-100	10-12	90	95	100	120	132	156
BROWN							
100-200	5-10	55	56	57	60	66	78
200-300	3-5	44	45	47	50	55	65
300-500	2-3	34	36	37	40	44	52

PPC : Preprocessing Centre
PC : Processing Centre
EXP : Exporter
BUY : Buyer

Table . 11

PRICE BEHAVIOUR OF SHRIMPS IN EXPORT MARKETING CHANNEL-4

Headon Grade Count/kg	Wt/Prawn (gm)	Producer price (Rs/Kg.)	INTERMEDIARIES			Consumer price (Rs./Kg.
			PC	EXP	BUY	
WHITE						
40-50	20-25	175	180	203	224	263
50-60	16-20	155	160	180	198	234
60-80	12-16	135	138	148	162	193
80-100	12-12	115	120	126	138	164
100-120	8-12	95	100	107	118	139
120-140	7-8	75	80	88	97	115
TIGER						
20-30	35-50	250	260	280	308	364
30-40	25-35	210	220	240	264	312
40-50	20-25	[illegible]	190	210	231	273
50-60	16-20	150	160	180	198	234
60-80	12-16	115	120	140	154	182
80-100	10-12	95	100	120	132	156
BROWN						
100-200	5-10	56	57	60	66	78
200-300	3-5	45	47	50	55	65
300-500	2-3	36	37	40	44	52

PC : Processing Centre
EXP : Exporter
BUY : Buyer

Table. 12

PRICE BEHAVIOUR OF SHRIMP IN EXPORT MARKETING CHANNEL-5

Headon Grade Count/kg	Wt/Shrimp (gm)	Producer Price (Rs./KG)	INTERMEDIARIES EXP	INTERMEDIARIES BUY	Consumer Price (Rs/kg)
WHITE					
40-50	20-25	180	203	224	263
50-60	16-20	160	180	196	234
60-80	12-16	136	148	162	193
80-100	10-12	120	126	138	164
100-120	8-10	100	107	118	139
120-140	7-8	80	88	97	115
TIGER					
20-30	35-50	260	280	308	364
30-40	25-35	220	240	264	312
40-50	22-25	190	210	231	273
50-60	16-20	160	180	198	234
60-80	12-16	120	140	154	182
80-100	10-12	100	120	132	156
BROWN					
100-200	5-10	56	60	66	78
200-300	3-5	47	50	55	65
300-500	2-3	37	40	44	52

EXP : Exporter

BUY : Buyer

Table. 13

BEHAVIOUR IN DOMESTIC PRICE MARKETING CHANNEL NO.1

Common Name (Local Name)	Size grade (Wt/ fish)	Producer price (Rs/Kg) (gm)	Intermediaries		Retail price
			PRE Harvest Contractor	Wholesaler	
Pearl spot (KARIMEEN)	I (350)	30	35	40	50
	II (250)	22	26	30	40
Mullets					
(THALUTHA)	I (500)	35	40	45	50
(Kanambu)	I (300)	28	30	32	36
	II (200)	24	26	28	30
	III (100)	15	17	19	24
Tilapia	I (350)	12	14	16	20
(Filoppy)	II (250)	8	10	12	15
Milkfish (POOMEEN)	I (500)	28	32	36	40
	II (350)	25	26	30	33
	III (250)	18	22	24	28
Crabs (NJANDU)	Large (350)	40	45	50	60
	Small (250)	25	30	35	45
Miscellaneous		10	14	16	24

Table. 14

PRICE SPREAD IN MARKETING CHANNEL NO. 2

Common Name (Local Name)	Size grades (Wt./ fish)	Producer price (Rs/Kg)	Intermediaries: Wholesaler	Intermediaries: Retail commission Agents	Retail-Price
Pearl Spot	I (350)	32	35	45	54
(KARIMEEN)	II (250)	24	26	35	43
Mullet	(500)	35	40	50	55
(THIRUTHA)	I (300)	30	32	36	40
(KANAMBU)	II (200)	25	27	30	32
	III) (100)	16	18	22	25
Tilapia	I (350)	14	15	20	24
(PLOPPY)	II (250)	10	12	15	17
Milk Fish (POOMEEN)	I (500)	30	32	40	45
	II (350)	25	28	32	35
	III (250)	20	22	26	30
Crabs	Large (350)	40	45	55	65
(NJANDU)	Small (250)	25	30	40	50
Miscellaneous		10	16	24	30

Table.15

PRICE SPREAD IN MARKETING CHANNEL NO: 3

Common name (Local Name)	Size grade (Wt./fish (g.m)	Producer Price (₹/K.g.	Intermediaries: Commission agent	Local Market Agent	Retail Price
Pearl Spot (KARIMEEN)	I (350)	32	35	40	45
	II (250)	24	26	30	35
Mullets (THIRUTHA) (KANANDU)	(500)	35	40	45	50
	I (300)	28	30	32	35
	II (200)	24	26	28	30
	III (100)	16	18	20	22
Threads (KILIMEEN)	I (350)	12	14	16	18
	II (250)	8	10	12	14
Milkfish (PALOMEEN)	I (500)	30	32	36	40
	II (350)	25	28	30	32
	III (250)	18	20	24	25
Grade (NEANDU)	Large (350	40	45	50	55
	Small (250)	25	30	35	40
Miscellaneous		10	14	16	20

Table. 16

PRICE SPREAD IN MARKETING CHANNEL NO.4

COMMON Name (Local Name)	Size Grade	Size (Wt/fish) (gm)	Predecers Price (Rs/Kg)	INTERMEDIARIES WORKER CUM VENDOR	(Retailer) Fishermen Vendor
Pearl spot (KARIMEEN)	I	(350)	30	35	45
	II	(250)	25	28	35
Mullet (THIRUTHA) KANAMBU)		(500)	35	40	50
	I	(300)	30	34	40
	II	(200)	25	28	32
	III	(100)	15	18	22
Tilapia (PILLOPPY)	I	(350)	14	15	25
	II	(250)	10	12	16
Milk fish (POOMEEN)	I	(500)	30	35	45
	II	(350)	25	28	35
	III	(250)	20	22	25
Crabs (NJANDU)	large	(350)	40	45	55
	Small	(250)	20	30	40
Miscellaneous			10	16	25

Table. 17

PRICE SPREAD IN MARKETING CHANNEL NO.5

COMMON NAME (LOCAL NAME)	Size grades	Size (Wt./fish) (gm)	Producer Price (Rs./Kg)	Consumer
Pearl spot (KARIMEEN)	I	(350)	30	35
	II	(250)	25	28
Mullet (THIRUTHA) (KANAMBU)		(500)	35	40
	I	(300)	30	32
	II	(200)	25	27
	III	(100)	20	22
Tilapia (PILLOPPY)	I	(350)	15	17
	II	(250)	10	12
Milk fish (POOMEEN)	I	(500)	30	35
	II	(350)	25	30
	III	(250)	20	22
Crabs (NJANDU)	Large	(350)	40	45
	small	(250)	25	30
Miscellaneous			10	15

wholesale collection depot, processing centre and an exporter is given in Table 9. The farmers are getting a better price than channel 1 because of the absence of financeer-cum agent. Preharvest Contractor comes to the production centre during the harvest season and the producers are free to discuss and negotiate the rate of each specific count without much obligations.

Channel 3 involves only four intermediaries as commission agent, processor, exporter and buyer (Table 10). Here the price received by the producer is comparatively better than channel 1 & 2. Due to the recent stiff competition among processing centres to collect aquaculture raw materials, the producers are also getting a better rate. They are enjoying the freedom of selling the product to any pre-processing agent or commission agent as they have not taken any loan from them.

Channel 4 shows the direct flow of products to processing centres and then to the exporter. (Table 11. This is a better organized channel and three intermediaries such as processing centres, exporter, and buyer are involved in the transactions. It is mainly used by scientific prawn farmers and wealthy traditional farmers. Here the raw material moves directly to the processing centre without the involvement of any intermediaries. These producers are well aware of the current market rates of the raw material and they are selling to the processing centres which offer the best competitive price. Prices are finalised before the harvest and the processors comes to the site during the harvest and takes the raw material in the best possible transporting facility.

FIG. 10

PRICE BEHAVIOUR OF TIGER

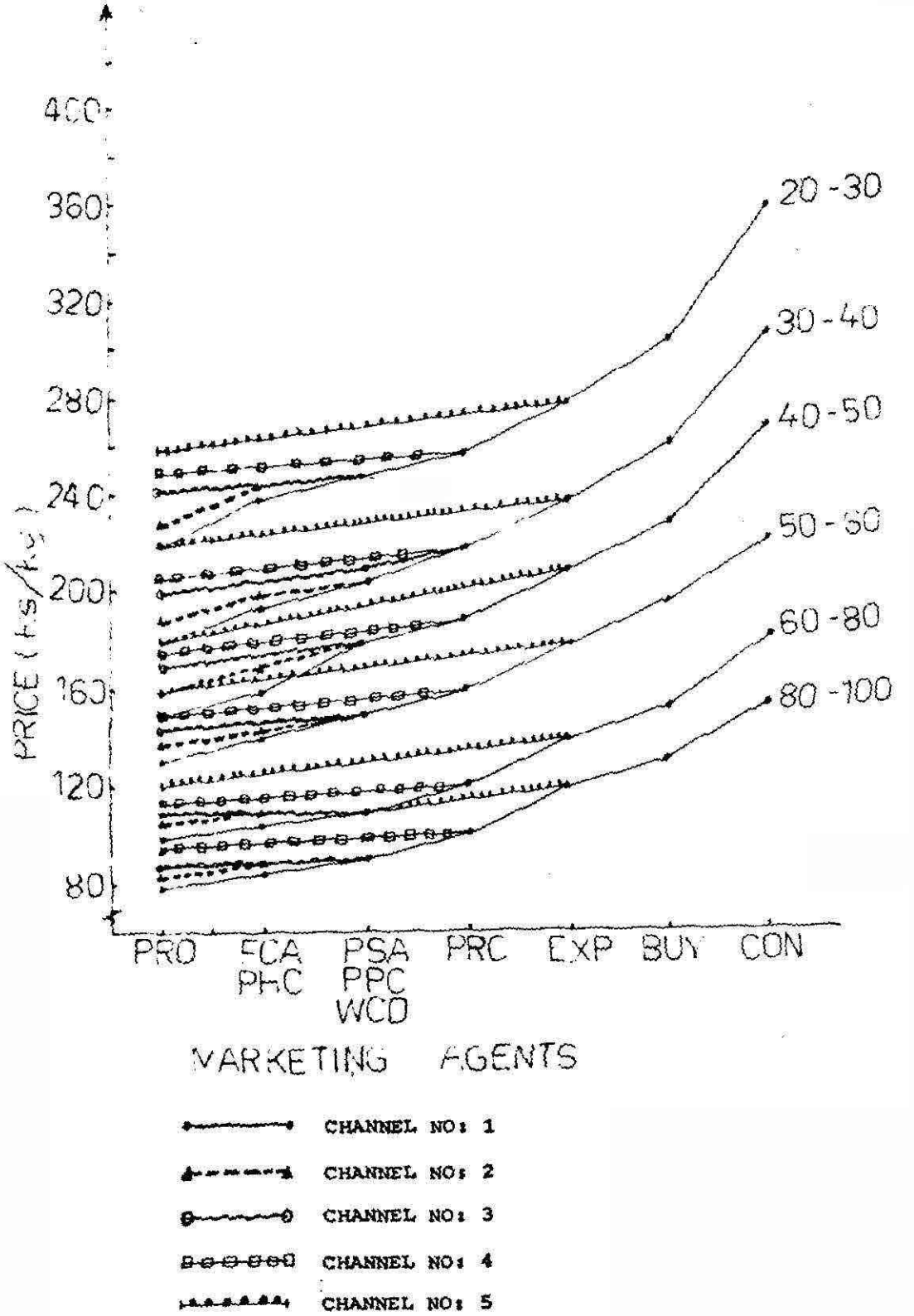


FIG. 11

PRICE BEHAVIOUR OF WHITE

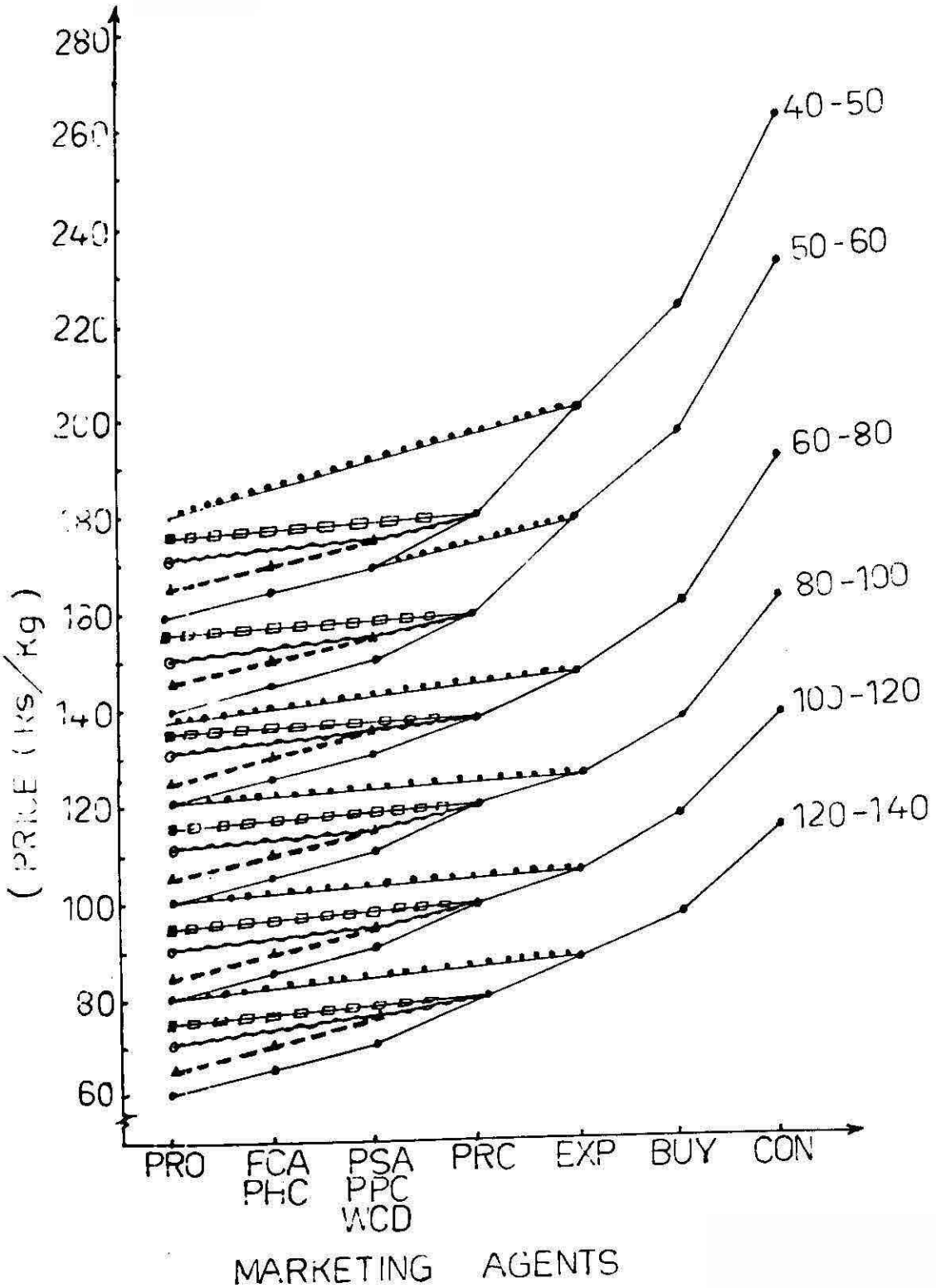


FIG.12

MONTHLY AVERAGE PRICES (Japan) FOR 3 GRADES OF HL SHRIMP

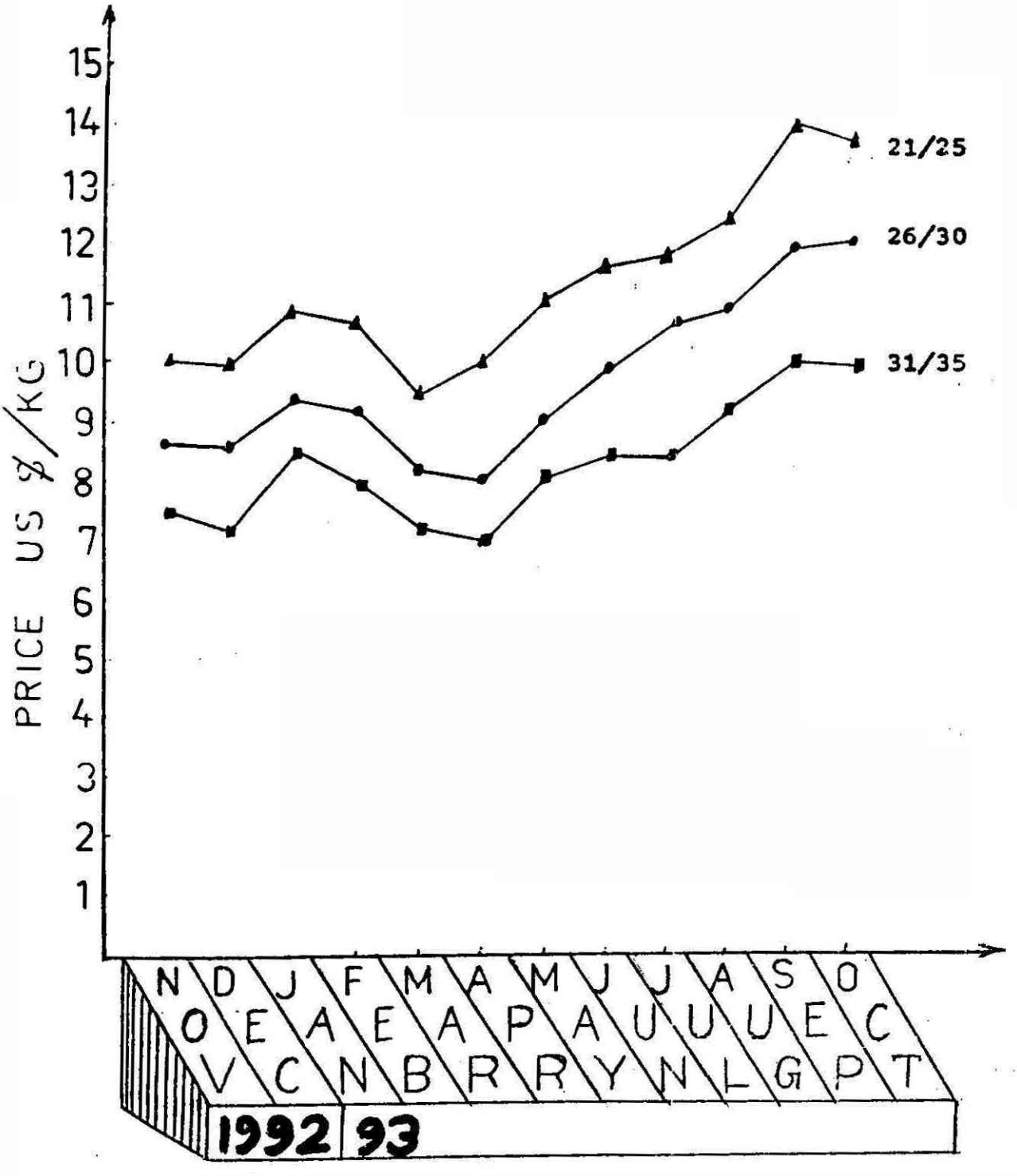
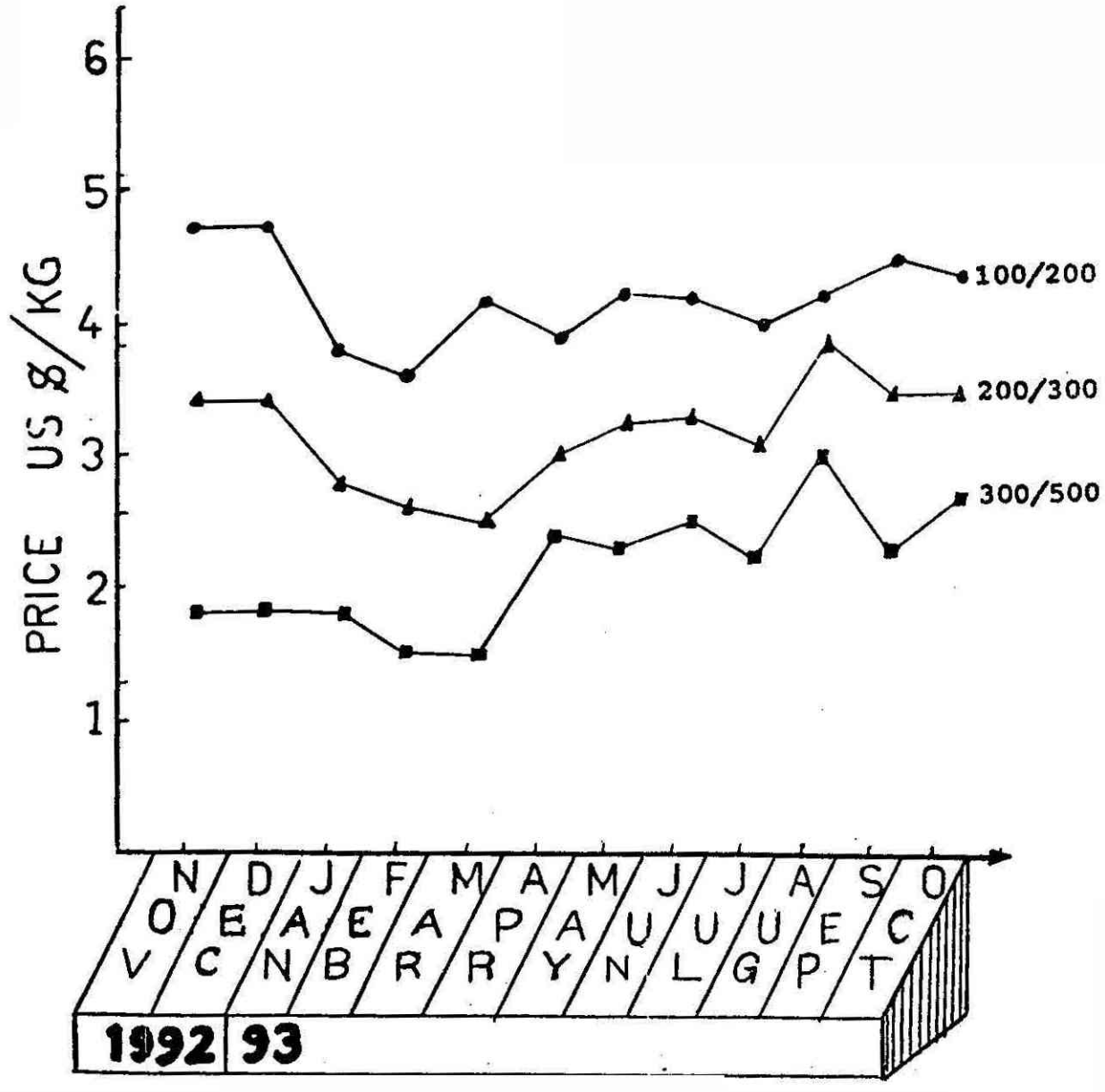


FIG . 13

MONTHLY AVERAGE PRICES (USA) FOR 3 GRADES OF PUD SHRIMP



White and tiger are the main varieties flowing through this channel. However, brown prawns are also handled very rarely. The weighted average price of the raw material is back calculated from the current CIF rates.

In channel 5 only two intermediaries are involved between the producer and the consumer, (Table 12). This is the best marketing channel for the producer, available in India under the present system of aquaculture product marketing. This system of marketing is available mainly for the commercial semi-intensive farms of Nellore, Guntur and Tuticorin. Here the exporter owns a shrimp farm or he gives consultancy to other enterpreneurs through a buyback agreement. Hence the exporter gets a regular supply of the product according to the demand of the buyer. The harvested prawns are reaching the processing unit in the best possible auality form. Here the producers are getting the maximum price for all grades of prawns. Only white and tiger, are moving through this channel. Price of white ranges prawn Rs.150/Kg to Rs.200/Kg whereas for tiger it ranges from 200-250/Kg.

Before 20 years the price of whote prawn was only Rs.8/Kg and tiger was Rs.13/Kg (George 1974). During the same period brown varieties had only Rs.2-3/Kg. Sathiadhas el at (1989) reported that the unit price for white prawns during 1986-88 was Rs.40/Kg. The price of tiger and brown were only Rs.60/Kg and Rs.10/Kg respectively. During the last few years the price of all aquaculture products have increased considerably.

B. PRICE BEHAVIOUR IN DOMESTIC MARKETING

Finfishes are the major item of domestic marketing, consisting of pearl spot, mullets, milkfish and tilapia. Crabs are also contributing a minor share of aquaculture products to domestic markets. These are considered as the by-catches from seasonal and perennial ponds. Unlike the export marketing system the less valuable items are usually marketed with in 30 km of the production site. The marketing intermediaries are also different from that of export marketing. Eventhough there are inter-connections among the marketing intermediaries five distinct domestic marketing channels are identified. Another entriely different channel is also existing for the marketing of rejected, inferior quality prawns from the export marketing. These products are usually reaching the hoteles and pickle industries.

Domestic marketing channel - 1 shows the product flow from producer through a preharvest contracter, wholesaler and retailer to reach the consumer. (Table: 13). The flow of aquaculture products from Vypeen Island to nearby markets such a Ernakulam, Thevara, Edappally and Kaloor were analysed in this channel. The consumer price mentioned is the average of the above 4 markets. These markets are situated with in 20 km of the production site. Retailers in these markets purchase the product from wholesalers and sell to the consumers. Finfishes from culture ponds are reaching in these markets mainly for 2 months (March-April). Fishes are graded into two to three grades depending on the weight of individual specimen. Although, Pearl spot, mullet, tilapia and milkfish are the common culture finfishes reaching the above markets.

Other varieties like megalops, catfishes, ambassis and carangids are also rarely found in the traditional ponds.

Domestic channel 2 illustrates the fish flow from producer to wholesaler, retail commission agents and retailers (Table 14). The markets located beyond 20 km from the production site like Aluva, Angamaly and Perumbavoor are included in this channel. The average retail price from these 3 markets are considered as the consumer price. The producers are getting a better price for all varieties of products and the consumers are paying a higher rate as the distance, between the production site and consumer market is more than the previous channel. Producers are getting a better rate mainly due to the absence of pre harvest contractor.

Domestic channel 3 deals with the consumers of the local markets at Narakkal and North Paravoor which are within 10 km from the production site (Table 15). The marketing intermediaries involved in this channel are wholesale Commission agents, local market agents and retailers. As the products are marketed near the production site the consumers are paying a lesser rate. In these markets aquaculture finfishes are available for almost 6 months of an year.

Some workers of the traditional ponds are also sometimes involved in the marketing of aquaculture products (channel 4). The family members and relatives of the traditional farmers sell the finfishes and crabs to consumers like Hotels, cold storages and regular customers in some households in Ernakulam city

(Table 16). Fisherwomen are mostly acting as agents for the bulk consumers in hotels and cold storages. In this type of marketing the consumers are getting the products at a comparatively cheaper rate than the open markets.

A limited quantity of finfishes are sold to nearby consumers directly by the producers without involving any intermediaries (channel 5). Usually consumers with in 5 km of the production site are mostly benefitted through this channel (Table 17).

Another entirely different type of domestic marketing channel is the flow of rejected products from the export units. Here the inferior quality prawn products from processing centres and export units are collected by a commission agent at the rate of about Rs.25/Kg and marketed to nearby pickle industries and hotels at the rate of about Rs.50/Kg. This Channel is beneficial for both the exporters and bulk consumers like hotels and pickle industries. Usually the Indian consumers are least bothered about the quality. Many of the hotels are benefitted through this type of channel. Sometimes these inferior quality prawn products are reaching the Ernakulam main market and the consumers pay even up to the extent of Rs.100/Kg.

The study indicates that some of the finfishes from aquaculture fields command high consumer demand in domestic markets. Varities like Pearl spot, milkfish and mullets receive about Rs.30-50/Kg. The coastal regions which are not technically sutitable for prawn farming can be utilized for the culture of these species.

COMMON AQUACULTURE PRODUCTS

PLATE I - WHITE PRAWNS

PLATE II - TIGER PRAWNS

PLATE III - BROWN PRAWNS

PLATE IV - MUD CRABS

PLATE V - MILK FISH

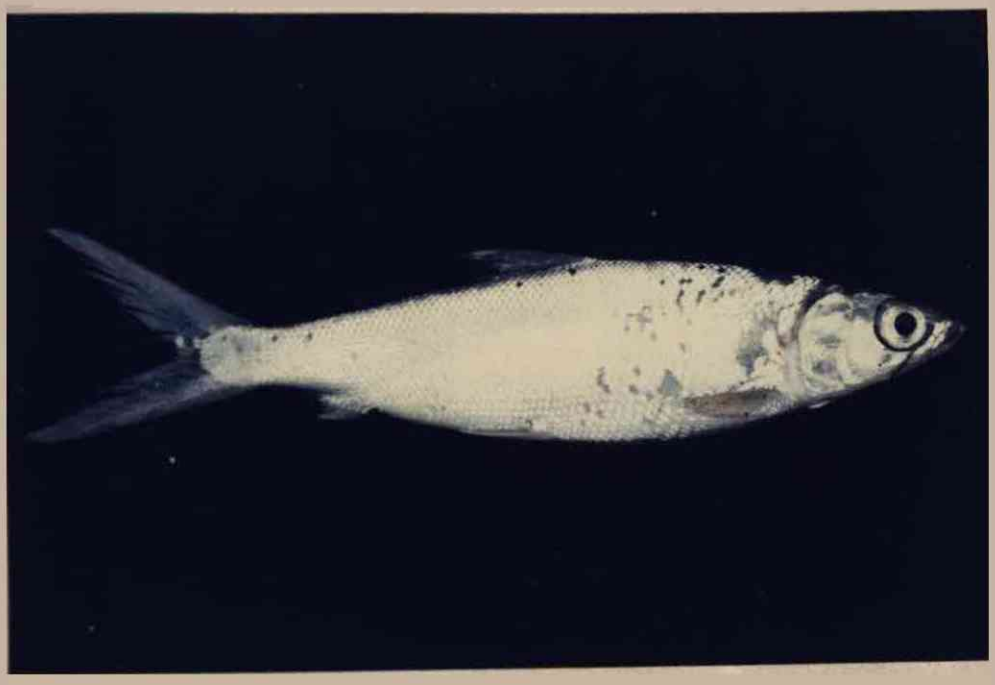


PLATE VI - PEARLSPOT

PRODUCER'S SHARE AND MARKETING MARGINS

The marketing margin is an indicator of the efficiency of marketing system. In the absence of any value added process, higher the level of marketing margins, the lower is the efficiency of the marketing system. Hence, if the aquaculture products can be transported quickly from the producer to ultimate consumer at the minimum cost, the marketing system is said to be efficient.

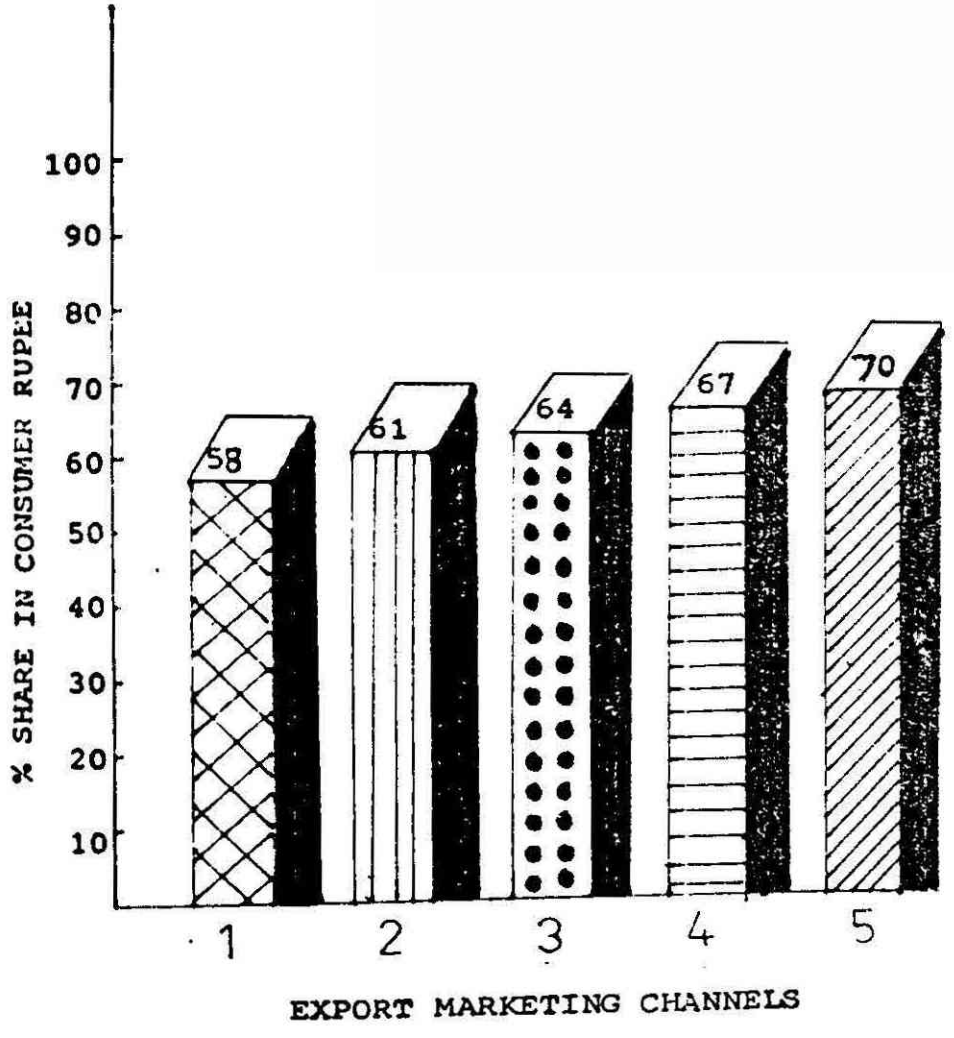
The highly perishable nature of prawns, seasonality of its production and distance between the producer and the processing centre, are some of the important factors which require attention while assessing the marketing margin. Producer's share and marketing margins are the two indicators of price spread. Producer's share is the percentage share received by the producer in consumer price. The difference between the consumer price and the producer's share gives the gross marketing margin. Gross marketing margin can be further divided into financer cum agent margin, Preharvest contractor's margin, pre-processor's margin, processor's margin, exporter's margin and foreign buyer's margin. These different marketing margins for each specific grade of the raw material (tiger and white) flowing through the export marketing channel are given in Table 20 and 21.

In the present study marketing margins are calculated separately for each category of middlemen.

(1) Gross marketing margin is the difference between the price offered by the consumer at Japan and the price received by the producer. (2) Pre-processor's margin is the difference between the

FIG.14

VARIATION OF PRODUCER'S SHARE IN DIFFERENT MARKETING CHANNELS



price offered to the producer or financier-cum-agent or the preharvest contractor and the price received from the processor (3) Processors marketing margin is the difference between the price received from the exporter to the price paid to the pre-processor. (4) Exporter's margin is the difference between the CIF rate (Cost Including Freight rate) and the FOB rate (Free on Board). It is the difference between the price offered by the buyer and the price given to the processor (5) Buyer's marketing margin is the difference in price offered by the Super markets in the importing country and the price offered to the exporter in India. This includes the reprocessing charges and re-packing expenses into consumer packs, attractive to the consumers.

(2) The Gross Marketing margin for white, tiger & brown in all export marketing channels are listed in Table 19. The gross marketing margin for white ranged from 27 - 48%, the average being 36%. Gross marketing margin for tiger ranged from 29 to 54% with an average of 39%. For brown the gross marketing margin ranged from 28 to 42% with an average of 33%. This shows that the marketing margin for tiger is the highest followed by white and brown. So the gross marketing margin is directly related to the economic importance of the species. Since production from the traditional prawn farms of Kerala contains only 1-3 percent of tiger, the prawn farmers and intermediaries are getting a lessor profit for the products as they are handling mostly brown and white prawns.

In channel No.1, gross marketing margin for white prawn ranged from 38 - 48% and producer's share ranged from 62-52% of consumer

FIG. 17

MARKETING MARGINS (TIGER & WHITE)

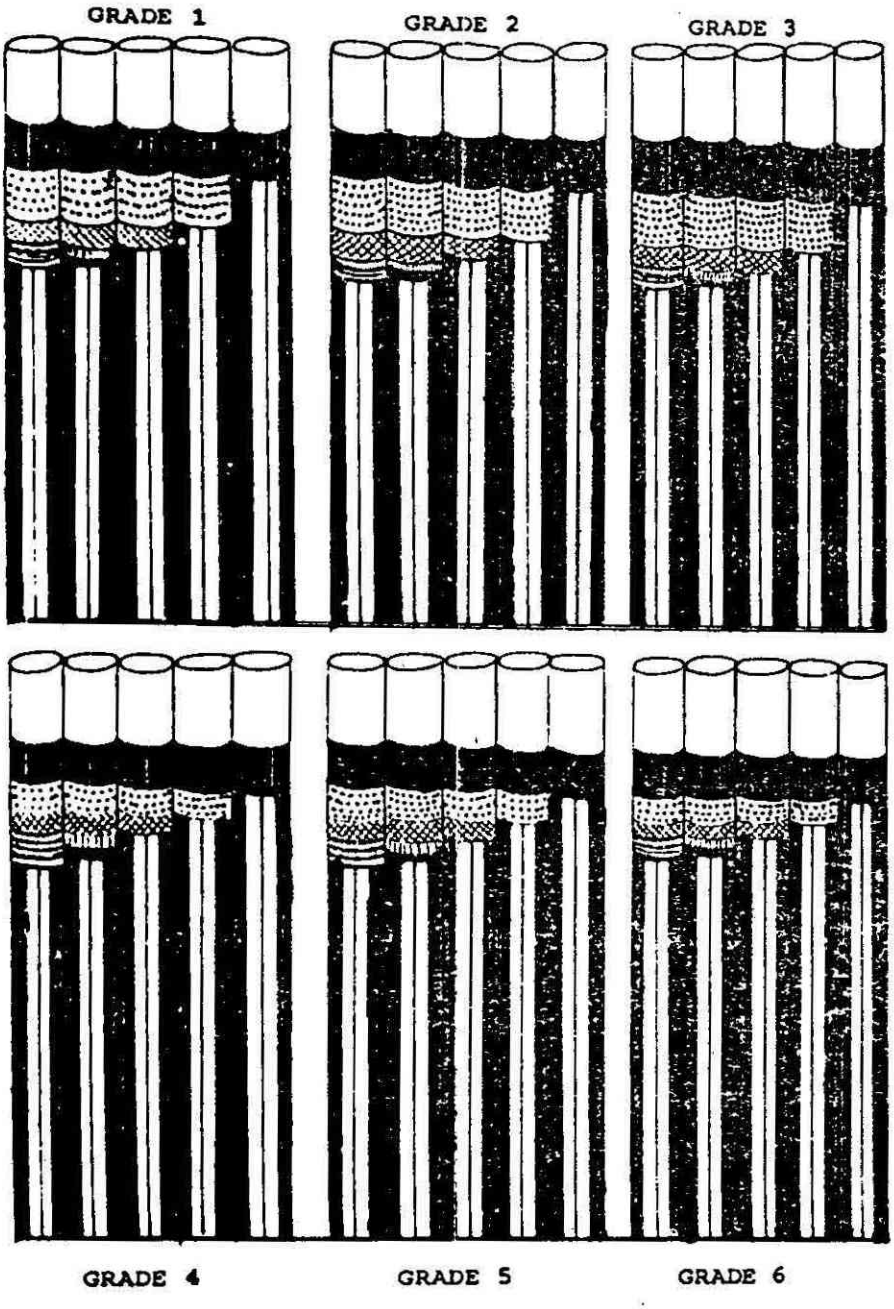


TABLE 18

PRODUCER'S SHARE IN EXPORT MARKETING CHANNELS

Grade count/by Headon	PRODUCER'S SHARE (%)				
	CHANNEL 1	CHANNEL 2	CHANNEL 3	CHANNEL 4	CHANNEL 5
WHITE					
40 - 50	61	63	65	67	68
50 - 60	60	62	64	66	68
60 - 80	62	65	67	70	72
80 - 100	61	64	67	70	73
100 - 120	58	61	65	68	72
120 - 140	52	57	61	65	70
TIGER					
20 - 30	60	63	67	69	71
30 - 40	58	61	64	67	71
40 - 50	55	59	62	65	70
50 - 60	56	60	62	64	68
60 - 80	55	58	60	63	66
80 - 100	51	54	58	61	64
BROWN					
100 - 200	64	67	70	71	72
200 - 300	62	65	68	69	72
300 - 500	58	68	65	69	71
AVERAGE	58	61	64	67	70

TABLE. 19

GROSS MARKETING MARGIN IN EXPORT MARKETING CHANNELS

Grade count/by Headon	GROSS MARKETING MARGIN				
	CHANNEL 1	CHANNEL 2	CHANNEL 3	CHANNEL 4	CHANNEL 5
WHITE					
40 - 50	39	37	35	33	32
50 - 60	40	38	36	34	32
60 - 80	38	35	33	30	28
80 - 100	39	36	33	30	27
100 - 120	42	39	35	32	28
120 - 140	48	43	39	35	30
TIGER					
20 - 30	40	37	33	31	29
30 - 40	42	39	36	33	29
40 - 50	45	41	38	35	30
50 - 60	44	40	38	36	32
60 - 80	45	42	40	37	34
80 - 100	49	46	42	39	36
BROWN					
100 - 200	36	33	30	29	28
200 - 300	38	35	32	31	28
300 - 500	42	37	35	37	29
AVERAGE	42	39	36	33	30

TABLE 20

PRE-PROCESSOR'S MARGIN AND PROCESSOR'S MARGIN IN EXPORT MARKETING CHANNELS

.....

GRADE	PRE PROCESSOR'S MARGIN			PROCESSOR'S MARGIN			
Count/kg Headon	CHANNEL 1	CHANNEL 2	CHANNEL 3	CHANNEL 1	CHANNEL 2	CHANNEL 3	CHANNEL 4
WHITE							
40 - 50	3.8	3.8	1.9	3.8	1.9	1.9	1.9
50 - 60	4.2	4.3	2.1	4.3	2.1	2.1	2.1
60 - 80	5.2	5.2	2.6	4.1	1.6	1.6	1.6
80 - 100	6.1	6.1	3.0	6.1	3.0	3.0	3.0
100 - 120	7.2	7.2	3.6	7.2	3.6	3.6	3.6
120 - 140	8.7	8.7	4.3	8.7	4.3	4.3	4.3
TIGER							
20 - 30	8.2	5.5	1.4	2.7	2.7	2.7	2.7
30 - 40	8.0	6.4	3.2	4.8	3.2	3.2	3.2
40 - 50	10.9	7.3	3.7	3.6	3.6	3.6	3.6
50 - 60	8.5	4.3	2.1	4.3	4.3	4.3	4.3
60 - 80	5.5	5.5	2.7	5.5	2.7	2.7	2.7
80 - 100	6.4	6.4	3.2	6.4	3.2	3.2	3.2
BROWN							
100 - 200	6.4	3.8	2.5	2.5	1.2	1.2	1.2
200 - 300	7.6	7.6	1.5	3.1	3.1	3.1	3.1
300 - 400	9.6	5.8	3.8	3.8	1.9	1.9	1.9
AVERAGE	7.1	5.9	2.8	4.7	2.7	2.8	2.8

TABLE 21

EXPORTER'S MARGIN AND BUYER'S MARGIN

IN EXPORT MARKETING CHANNELS

GRADE	EXPORTER'S MARGIN	BUYERS MARGIN
Count/kg (Headon)	CHANNELS 1 2 3 4 5	CHANNELS 1 2 3 4 5
WHITE		
40 - 50	8.7	8.0
50 - 60	8.5	7.7
60 - 80	5.2	7.3
80 - 100	3.7	7.3
100 - 120	5.0	7.9
120 - 140	7.0	7.8
TIGER		
20 - 30	5.5	7.6
30 - 40	6.4	7.7
40 - 50	7.3	7.8
50 - 60	8.5	7.7
60 - 80	10.9	7.6
80 - 100	12.8	7.5
BROWN		
100 - 200	3.8	7.6
200 - 300	4.6	7.9
300 - 400	5.7	7.7
AVERAGE	6.9	7.6

rupee. The average producers share for white works out at 59%, and the average marketing margin is 41%. For tiger prawn it ranged from 40-49% and the producers share was 51-60%. The marketing margin for brown prawns was only 38% of consumer price.

The average producer's share in export marketing channel 1 was only 58% and this increases upto 70% in channel 5. (Fig. 15). A difference of about 12% is observed between the first and the fifth channels. At present most of the traditional farmers of Kerala are loosing about 12% of the consumer rupee mainly because of the inefficient, and complex marketing system.

Pre-processors are present only on the channels 1, 2 and 3 (Table 20). Their margin ranges between 1.4% to 10.9%. The average pre-processors margin reduces from 7.08% in channel 1 to 2.77% in channel 3. This variation is mainly because of the fact that in channels 1 and 2 pre-processors margin includes the margin of the financier cum agent and pre harvest contractor.

The actual pre-processor's margin is given in channel 3. It ranges from 1.9% to 4.3% with an average of 2.77% of the consumer rupee. In a many cases the financier can agents and preharvest contractors are collection agents of the pre-processors and processing centres. So the ultimate pre-processor's margin is the sum of financier cum agents margins and pre-processors margin as given in channel 3.

Processes are present only in channels 1,2,3 and 4 (Table 20). In channel 1, the processors margin is higher than rest of the channels. This is due to the supply of raw materials at a cheaper rate through the financier cum agents. The processor's actual average margin is only 2.83% of the consumer rupee.

Exporter's margin and Buyer's margin remains same for all the marketing channels. The average exporters margin is only 6.9% of the consumer rupee. The foreign buyers purchase Indian prawns as raw material for reprocessing and repacking. The average buyer's margin is about 7.6% of the consumer rupee. Rest of the percentage share of the consumer rupee is taken by trade houses and super markets of the consumer markets. Advanced value added products like breaded and battered shrimp products are prepared with this raw materials. Corresponding to their advanced value addition the percentage of the retailers and trade houses in ranges from 12 - 16% of the consumer rupee.

In the domestic marketing channels the producer's share have ranged between 60-95% (Table 22). However this share is insignificant as the domestic marketing provides only about 5% of the total revenue of traditional shrimp farming.

It is observed that at the last two stages of the export marketing there is no change in the marketing margins earned by Exporter and Buyer (Fig.17). The complexity of the marketing system is decreasing as the product moves from the producer to the consumer. Exporter and Buyer are the two essential intermediaries applicable for all the channels. Their marketing margins remain constant irrespective of the source of the product and role of different intermediaries. In the present export marketing system the cultured shrimps have to pass through three essential intermediaries such as processor, exporter and buyer to reach the ultimate Consumer. The flow of products through different intermediaries and price behaviour of tiger and white prawn has been shown in Fig. 10 & 11.

In the extensive and semi-intensive farms more than 70% of the

TABLE : 22

PRODUCER'S SHARE IN CONSUMER RUPEE IN DOMESTIC MARKETING PRODUCTS

FISH VARIETY	CHANNEL 1	CHANNEL 2	CHANNEL 3	CHANNEL 4	CHANNEL 5
Etroplus I	60	59	71	67	85
II	55	56	69	71	89
Mullet I	70	63	70	70	87
II	77	75	80	75	93
III	80	78	80	78	93
IV	63	64	73	68	90
Tilapia I	60	58	71	56	80
II	54	59	57	62	63
Milkfish I	70	66	75	67	65
II	76	71	78	71	83
III	64	67	60	80	90
Crabs I	57	61	73	73	88
II	56	50	63	50	83
Miscell.	42	33	50	40	66
Average	60	62	69	65	86

cultured tiger prawns belong to 30-40 count and producers price ranges form Rs.180 to Rs.220/Kg. Cultured white prawns are mostly in the 50-60 count and producers are getting Rs.140 to Rs.160/Kg. In the present system of aquaculture shrimp marketing tiger prawns fetches about Rs. 200/Kg and white prawns get about Rs. 150/Kg. This can be further increased if majority of the prawns belongs to larger size grades. In the scientific shrimp farms brown varieties are entirely eliminated as it fetches only lesser revenue because of its small size. The producers are getting least price in channel 1 and best price in channel 5. Most of the prawn farmers prefer to sell their products through channel 5. The role of financier cum Agent, Preharvest contractor, Preprocessing agents, Peeling shed Agents has to be minimised to improve the marketing efficienty.

Recently under the satellite farming system prawn farmers of the Nellore and Guntur region market their aquaculture products through a processor cum exporter. Here both the producer and exporter are equally benefitted. The producers are getting the maximum rate for each count of the raw material and the exports are receiving a regular supply of sufficient raw material to meet the foreign buyers demand. Thus the price of shrimp depends not only on size, quality and species but also in an efficient marketing system.

MARKETING EXPENSES AND PROBLEMS

Marketing expenses are the various cost inputs utilized for the preservation and transportation of aquaculture products. In order to maintain the quality the products undergo various processing, treatments and packagings while it is marketed through export marketing systems. Due to the highly perishable nature of shrimp products it should be handled carefully and hygenically through out the marketing channels. Plastic containers are used for packing the rawmaterial for transporting from the production site to the processing centres. About 20-30 kg of prawns are packed in each container with equal quantity of ice and transported by trucks, tempos and auto-rikshas. After reaching the processing centre, the material is peeled and again graded into different categories based on count per pound. These are further processed into block frozen products or IQF based on the availability of the processing facilities. These processed products are packed in carbons (1.8kg), repacked in master carbons (20kg) and well arranged in container. (25 tons) for shipment.

Table 23 shows the various marketing expenses for 1000kg of rawmaterial. The various marketing costs include handling, transportation, processing and export. The total marketing expense for a kilogram of HL Shrimp is found to be abbut Rs. 23 per kg. In the marketing cost the major share goes for export charges (55%), followed by processing charges (32%). Other marketing expenses include peeling charges (6%), ice cost (4%), packaging cost (2%), transportation cost (1%).

Pillay (1990) emphasized the need of product quality and presentation in efficient marketing of Aquaculture products. Packaging of the product is equally important in building up consumer acceptance.

The major challenge faced by the marketing agencies is from quality control, and hygenic handling of products. At present aquaculture products from the traditional ponds are available only for a limited season of the year. Eventhough, 85% of the export units are situated in Cochin area, the contribution of shrimps from culture ponds are very much limited. Eventhough, many pre-processing centres (peeling sheds) are situated in the Ernakulam District, they are fully operated only for three to four months in an year. This is mainly because of the limited number of extensive and semi-intensive farms in Cochin region. The hygenic standard in many of the peeling sheds can be further improved to attain better prices in the international market.

Another important problem faced by the workers and pre-processing centres is that they are getting only Rs. 1.25/kg for peeling into HL product, and Rs. 1.75/kg for converting into PUD product. The peeling charges are remaining at a lower rate eventhough the price of the rawmaterial and finished products has increased many times during the last few years. There are about 1000 exporters handling the marine products exporting to various countries. However, only 60 exporters belong to the A grade with a certificate of exporting the product directly into Japan and USA. Most of the other exporters are depending on these A grade exporters either directly or indirectly for marketing their products. Food and Drug Control Agency(FDA) of

USA is very much strict about the quality of the product imported from India.

A general problem for the exporters of India is that still we are exporting our products as rawmaterial for re-processing and repacking. Most of these products are purchased by a foreign buyer and later the product is processed according to the consumer needs. Thus infact at present India is losing substantial foreign exchange.

An individual can peel about 25 kg of prawns per day into HL form. However only about 15kg of raw material per day can be converted into PD and PUD by a single person. So the total number of man days required to convert our present aquaculture shrimps of 45,000 ton works out to be about 22,50,000 mandays. According to the latest reports (1992) of MPEDA there are about 900 peeling sheds and on an average 25 persons are working in each peeling sheds. Recently introduction mechanised peeling has started reducing the employment opportunities of these fishermen.

Disposal of peeling shed wastes is another problem for the pre-processing centres. Each year about 50,000 tonnes of shrimp head waste and shells are discharged and this can be utilized either in the shrimp feed mills or in the chitosan industries.

Lack of infrastructural facilities, absence of mechanism to monitor the quality of prawns and shortage of potable water are same of the problems leading to the present plight of the peeling sheds. There are two catagories of the value addition viz- primary value addition and advance value addition. Considering the poor infrastructure facilities now available in our country, India can take advantage of the primary

value addition. Production of advanced value added products requires high capital investments, technical assistance and financial arrangements from abroad.

Table: 23

MARKETING EXPENSES PER 1000 Kg PRAWN

	PARTICULERS	Rate (Rs/1000kg)
1.	Cost of Export Charges (Cargo Freight)	12,650
2.	Cost of Processing (Freezing)	7,350
3.	Cost of Pre-Processing (Peeling)	1,500
4.	Cost of Packing	1,000
5.	Cost of Transport	200
6.	Cost of Chemicals	100
7.	Miscellaneous Expenses	200
	Total	23,000

Therefore Marketing Expenses Per 1 kg Prawn = Rs 23.00/kg

(Headon Raw Material)

MARKETING OF OTHER AQUACULTURE PRODUCTS

Crabs (Scylla serrata), Spiny lobsters (Panulirus polyphagus), Edible oyster, Pearl oysters, and giant fresh water prawns are also cultured and marketed, at an experimental level. A complete marketing channel for these products could not be traced as these aquaculture practices are yet to be commercialised. Marichamy (1993) has described the culture methods and crab fattening for profitable marketing. Radhakrishnan (1993) has analysed the present situation of spiny lobster culture in Gujarat. The raft culture of edible oysters, and the cage culture of Pearl oysters are also in experimental stage. However, these new methods of aquaculture are yet to be taken by the private entrepreneurs for commercial production. Freshwater prawns (Macrobrachium rosenbergii) is another potential species for aquaculture.

After 1985 India has started the export of value added products, and the present market trend reflect a rapidly growing demand for ready to serve and ready to cook products. A sofisticated consumer abroad as well as the urban consumer in our country demand new types of value added, hygenically prepared, nutritious and attractively packed products. Aquaculture shrimps are the best attraction for processing as IQF value added products. In 1992-93 India has exported 8587 metric tonnes of value added products fetching about Rs. 12,777 lakhs. The unit value of IQF shrimps has increased from Rs. 93/- in 1987 to Rs. 150/kg in 1992. Gopakumar (1993) has stated that the various factors which influence the demand of value added products are good expandable income, popularity of micro-wave oven and the general market move from deep fried towards ovanable products.

TABLE : 24

LIVE CRAB EXPORT

Q: Quantity (Tons)

V: Value (lakhs)

		1988	1989	1990	1991	1992
Thailand		--	--	--	--	1.80
						0.70
Hong Kong	Q	--	--	--	--	3.9
	V					2.61
Japan	Q		16.44	48.77	--	11.6
	V		2.33	19.40		71.08
Malaysia	Q	127.28	314.88	253.59	93.57	10.65
	V	21.97	65.30	51.54	21.18	28.22
Singapore	Q	119.79	281.24	381.43	424.06	47.05
	V	22.70	52.33	93.84	113.63	218.81
Total	Q	247.08	612.56	683.80	517.63	699.59
	V	44.67	121.02	164.79	134.81	321.44
Unit value Rs/Kg		18.07	19.75	24.09	26.04	44.66

Source MPEDA

LIVE CRAB MARKETING FROM CRAB FATTENING PONDS

The live crab marketing flourished only during the last five years. However, in 1990, Govt of India has imposed a ban on the export of live crab as the mud crab (Scylla cerrata) is considered as an endangered species. Still various exporting units are continuing the export of live crabs through Madras airport to some of the South-East Asian Countries like Singapore, Malaysia, Japan and Hong kong.(Table 24). During 1988 India has exported about 247 tonnes of live crabs valuing Rs. 45 lakhs and it increased to 700 tonnes valueing Rs. 321 lakhs. During the last five years the unit value has increased during 1992 from Rs. 18/kg to Rs. 45/kg. (Fig 18).

Mud Crab (Scylla serrata) is the dominant species of live crab export. These are collected from the traditional ponds, inlet cannals, lagoons, lakes and backwaters of Kerala and West Bengal. There is a lucrative market for mud crab in countries bordering the Bay of Bengal region (Liong 1991). In recent years, the wild catch of mud crab/green crab/mangrove crab or brown crab) is declining and the exporters are not getting enough product to meet the increasing demand. Crab culture and crab fattening are the two alternatives to meet the present demand of live crabs in the South-East Asian markets (Daisy and Lin 1991).

Crab fattening is profitable than the crab culture technique as it involves short duration. It is a holding operation during which immature crabs and newly moulted are kept in enclosures and fed until their gonads develop or their shell hardens. At this stage the flesh fills the whole mandle cavity. This best quality product is known as mud. The poor qualities are named water, local, small and

FIG. 18

Mud Crab Marketing (Flow Chart)

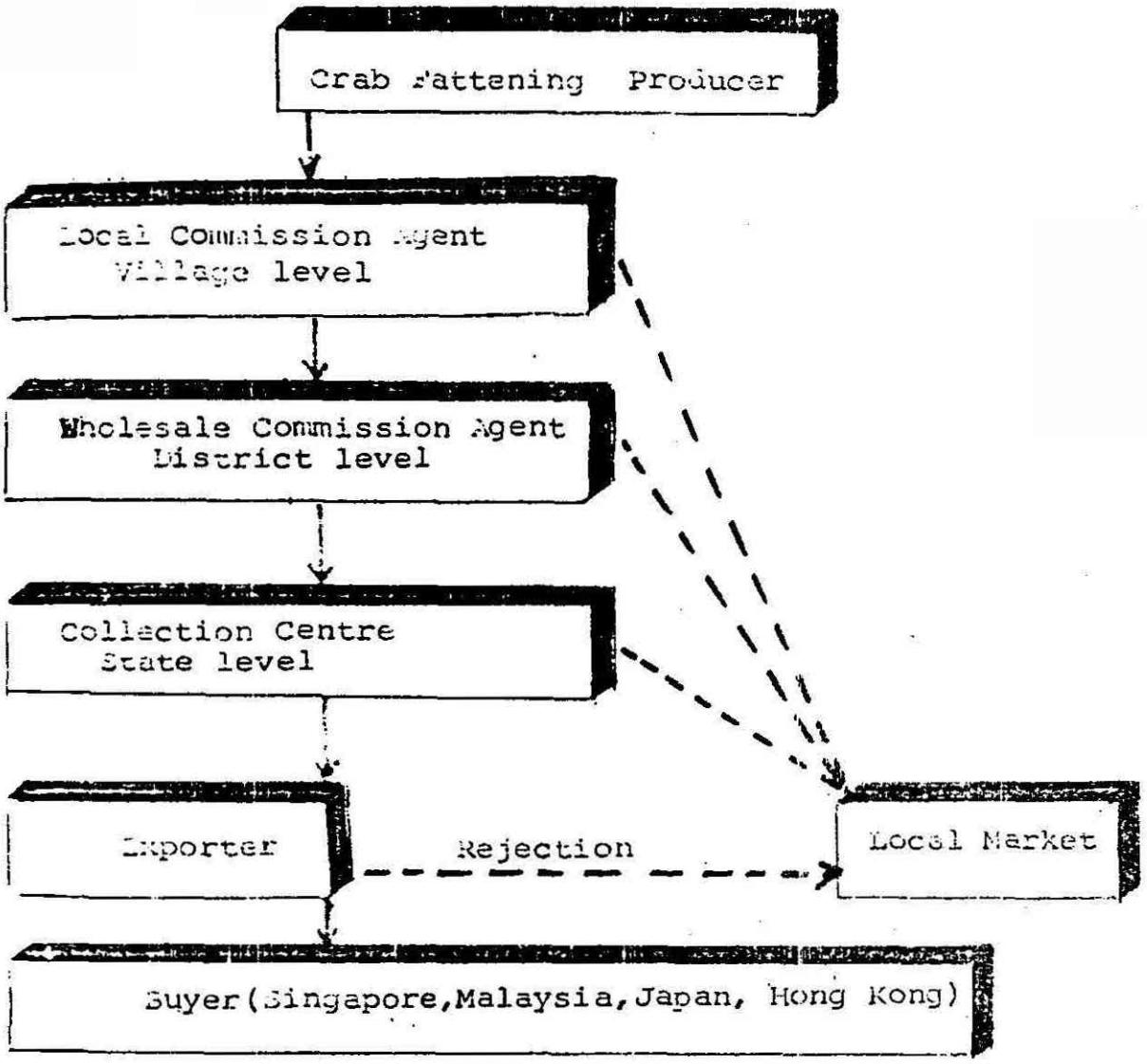


TABLE. 25

Price behaviour of MUD crab (Scylla cerrata)1993

Grade		Producer Price (Rs./kg)	Collection Centre price (..s./kg)	Singapore Price (Rs./kg)
1. MUD	550-1500 gm	155	175	260
.. SMALL	350-550 gm	50	75	120
.. WATER	350-550 gm	25	50	-
.. LOCAL	200-350 gm	10	20	-

dead. Such crab fattening ponds are coming up along the coasts of Puthuvypeen, Narackal, and Edavanakad in Ernakulam District. Crab fattening is profitable because of the fast turn over, low operating cost, high survival rate, controlled canibolism, migration and good market demand. The newly moulted crab (WATER) are discarded in the market and this can be converted in to top quality (MUD) just by holding in small pits or cannals for 4-5 weeks. Live crabs are marketed through the following marketing system (Table 18).

A local commission agent collects the live crabs and grade them into different categories based on an unscientific method of pressing the base of the third walking leg. The top quality MUD crabs are having a hard shell which can withstand the thump pressure whereas the water quality breaks the corapace at the ventral side of the base of the third walking leg. This shows that water quality has minimum meat content inside the body cavity. A MUD quality product fetches Rs.155/kg, if the single specimen weighs more than 550gm (table 27). Small varieties of MUD gets only Rs.50/kg (350-550gm size). The third quality WATER fetches about Rs. 25/kg eventhough the individual weight of the specimen ranges between 350-550 gm size. Fourth grade is the LOCAL (200-350 gm size) which has only Rs.10/kg. The third and the fourth varieties are usually rejected from the export market and it reaches the domestic markets.

A district level commission agent collects the live crabs from various local commission agents and transport to the railway station. Live crabs are packed in bamboo baskets, and each basket contain 50-60 crabs weighing about 25kg. Each individual crab is tied

securely by attaching the chelate legs to the abdomen, to reduce the cannibalistic tendency. From the district level commission agents this bamboo baskets are send to Madras Airport to be transported to is Singapore and Malaysia. The state level commission agents (Exporter) check the quality of the product and discard the dead and weak specimens. Healthy MUD quality crabs can withstand the strain of transportation upto three to four days.. The selected top quality products are again repacked in fresh bamboo baskets and send to various South-East Asian countries on the following days flight.

The present unscientific grading of crabs into MUD and WATER spoils the quality and gives strain to the specimen. A better method of scientific grading is yet to be established in the marketing system of live crabs.

Spiny lobsters are cultured only along the coast of Gujarat and these products are purchased through local commission agents and various processing centres.

Pearl and Edible oyster culture are taken up in a small scale by R & D organisations and developmental agencies. The cultured pearls are mostly marketed and through various jewellary shops in the urban cities like Hyderabad, Bombay, Madras, Calcutta and Cochin.

The Edible oysters are marketed through'harvest melas' and the oyster meat is usually taken by processing units for exports.

SUMMARY

1. Efficient marketing along with sufficient infrastructure facilities alone can ensure the speedy growth of the aquaculture industry in India. About 80% of the aquaculture products are flowing in the export channels and rest of the 20% reaches the domestic markets. Five export and fire domestic marketing channels were analysed. Another entirely different channel also exist for the transfer of inferior quality and rejected prawns from the export channels to the domestic markets. Tiger, white and brown prawns are the major items, contributing a share of about 95% of the total revenue. Pearl spot, mullets, tilapia, milkfish and small crabs are the common aquaculture products with high domestic demand. They contribute a share of about 20% of the quantity and 5% of the value earned from a typical traditional aquaculture pond. Aquaculture shrimp products contribute to about 15% of the total shrimp production and 33% of the shrimp export.

2. In the export marketing system the marketing intermediaries were identified as Financier cum agents, Preharvest contractors, Peeling shed agents, Pre-processors, Processors, Exporters and foreign buyers. Prominent domestic marketing intermediaries were commission agents, wholesalers, fisherwomen vendors, retail commission agents and retailers. The most efficient marketing channel for cultured shrimps is through Producer --> Exporter --> Foreign Buyer --> consumer.

3. Japan, USA and Western Europe are the major consumer markets of Indian aquaculture shrimps. Japan market has a share of about 40% of the quantity and 50% of the value of shrimps exports from our country. In recent years products like IQF shrimps and live crabs are gaining lucrative market in Western Europe and South East Asian countries. However as Japan is offering the maximum rate, the export of HL shrimps to Japan market is profitable. USA is offering the maximum price for good quality PUD products.

4. Price of aquaculture shrimps depend not only on size and quality but also an efficient marketing. The producer's price of white prawns ranges from Rs. 150-200/kg and for tiger prawns it ranges from Rs. 200-250/kg. However the production from the traditional ponds of Ernakulam district consists of 67% of brown prawns which fetch about Rs. 30-50/kg.

5. There is a wide gap between our total shrimp production and shrimp export. At present only about 33% of the shrimp products are reaching the export markets. Capture shrimp production contributes to about 67% of the shrimp export and rest of the quantity is supplied from aquaculture sector. During the 10 years our total shrimp production has almost doubled and aquaculture shrimp production has increased three times. However in terms of quantity our shrimp export has increased only less than 50%. No doubt the intensive trawling of our coastal waters during the last few years led to the increase in shrimp production but the same has not fully reflected in our shrimp exports.

6. Under the present system of export about 52% of the shrimp products are exported as PUD and PD products which fetches a lower unit value than the HL products. It clearly indicates that the catch from the marine sector is still dominated by undersized prawns, warranting some regulatory measures. However the best alternative to increase the share of HL products is though the aquaculture industry.

7. The producers' share in different export marketing channels ranged from 58% to 70%. At present many of the traditional farmers are loosing about 12% of the consumer rupee mainly due to the inefficient and complex marketing system. The average gross marketing margin ranged from 42 to 30% of the consumer rupee. The gross marketing margin was highest for tiger prawn (39%) followed by white (36%) and brown prawns (33%).

8. The gross marketing margin can be further sub divided into Pre-processor's margin, Processor's margin, Exporter's margin and foreign buyers margin. The pre-processor's margin in different channels ranged between 3-7%. The processors margin ranged from 3 to 5% of the consumer rupee. The exporter's and buyer's margin were 6.9% and 7.6% of the consumer rupee. Rest of the share of the consumer rupee (12-15%) is received by supermarket agents and retailors in the consumer markets.

9. The total marketing expenses for a kilogramme of Headless prawn product is Rs. 23/kg. This includes the shipping charges (55%), processing charges (32%), peeling charges (5%) and raw material procurement expenses (5%). The peeling charges for a kilogramme of the white prawn is only Rs. 1.25/kg and Rs.1.75/kg for PUD products.

10. A marketing channel involving only the essential intermediaries such as exporter cum processor and foreign buyer is the most suitable marketing system for the satellite shrimp farming. Marketing channels of traditional prawn farming items are more complicated than the scientific prawn farming products. This is mainly due to the crucial role of non-essential intermediaries. A system of well organised co-operative marketing along with financial assistance from MPEDA, BFFDA, NABARD and state banks can enhance the producer's share and reduce the role of financier cum agents and money lenders.

11. The unit value of best quality mud crab ranges from Rs.150-175/kg and this can be further improved through a better organised marketing system and scientific grading method. Crab fattening can be taken up as an alternative method of supplying live crabs to export markets like Singapore, Malaysia, Thailand and Japan. Cultured finfishes like pearlspot and mellets with Rs.40-50/kg command a high consumer demand in the domestic markets. The coastal regions which are not technically suitable for shrimp farming can be utilized for crab fattening and finfish culture.

12. The head and shell wastes from peeling sheds amounts to about about 50,000 tonnes per annum. This can be used as raw material for shrimp feed mills and chitin industries. Sanitary and hygenic conditions of the pre-processing centres and peeling sheds determines the ultimate quality of shrimps reaching the export market. Consistant quality, regular supply and reasonal price are the key factors for the successful marketing of aquaculture products.

REFERENCES

AJITH KUMAR, V. (1990). An analysis of Factor-product relationship in prawn farming - A product function approach. M.Sc Dissertation, Cochin University of Science and Technology Cochin, CMFRI, PP 67.

ALAGARSWAMI, K. (1990) 'Status of coastal Aquaculture in India' In Aquaculture in Asia Edited by M. Mohan Joseph, Asian Fisheries Society. (PP 163 - 185)

BARNETT, J and N.B. ANDREWS (1991) Successfully Marketing canadian Aquaculture products. Special session on Marketing 8th Annual Meeting of Aquaculture Association. PP 33 - 45

BOSTOCK, T.W., M.H. KALAVATHY and R. VIJAYNIDHI (1992) The processing and Marketing of Anchovy in the Kannyakumari district of south India, Scope for development. BAY of Bengal Programme/WP/85 for Fisheries Development: Madras, India; 1992, post Harvest Fisheries. PP 58

CHIDAMBARAM, K, (1975) Export Marketing of Seafood, Seafood Export Journal Vol-17, No.1 PP 59-63

CHIDAMBARAM, K. (1988) Manpower requirement of the fisheries sector in India . In Mohan Joseph (ed) The first Indian Indian Fisheries Forum proceedings. Asian Fisheries Society. Indian Branch, Mangalore, PP 481 - 485.

CMFRI Research High lights 1981-1993 - Annual Publications

DAISY F.L. and J.C. LIN (1991) Trade and marketing practices of mud crab in the Phillippines. The mud crab A report of the

seminar convened in Thailand. BOBP/PEP/51, pp 211 - 224.

DAS, S.K. (1991) Role of aquaculture in current Economic crisis of India. Seafood Export Journal Vol 23, No.10, pp 23 - 25

EDNOFT, M (1992) Direct and Niche Marketing of Aquaculture growing toward the 21st century.
World Aquaculture society May 1992 pp 121 - 137

FATIMA FERDOUSE (1990) USA - world second largest shrimp Market. Technical and Economic Aspects of shrimp farming-proceedings of the Aquatech '90 conference. Malaysia, pp 275-283

-- -- (1992) Latest developments in Asian Market. Proceedings of the Symposium, "Shrimp 92". Hong Kong-Infofish. pp72 - 76

FILOSE JOHN (1992) Surviving the Recession - problems and opportunities in an evolving US shrimp market Procedings of the symposium, Shrimp '92 Hong Kong-Infofish pp 52 - 57

GAUTAM, D.S (1993) Eating through the Eyes and Brain. Seafood Export Journal Vol 25, No.6 pp 5 - 7

GEORGE, K.V. (1974) Some aspects of prawn culture in the seasonal and perennial fields of Vypeen Island. Indian Journal of Fisheries Vol 21 (1) pp 1 - 19

GEORGE K.V. (1980) Economicsof Traditional prawn culture practices in Kerala with a note on the advantages of intensive prawn culture. Proceedings of the First National Symposium on Shrimp Farming. 16-18 August 1978 Bombay. The Marine products Export Development Authority, Cochin pp 131 - 137

GOPAKUMAR (1993) Marketing of value Added products Sea Food Export Journal. Vol.25, No.5 pp25 - 33.

GOPALAN, U.K., K.S. PURUSHAN and T.S.S. Rao (1980) Case studies on the economics of an improved method of paddy field shrimp culture in Vypeen Island, Kerala, Proceedings of the First National Symposium on Shrimp Farming. 16-18 August 1978, Bombay. 1978 pp 175 -186

GOVINDAN, T.K. (1976) Fresh Fish Utilization in India-ways and means for its improvement . Sea Food Export Journal Vol.8. No.4 PP 29 - 35

GUPTA, V.K, P.S GEORGE, G.S. GUPTA (1984) Marine Fish Marketing in India Vol IV.Supplies Impacts and protections.Indian Institute of Management Ahmedabad pp 221

HELGA JOSUPEIT & LUE DE FRANSSU (1992) EEC markets for value added shrimp from developing countries.pp 16 - 20. Infofish International 2/92

IKEDA SEIYA (1992) The Japanese Market - Is it reaching saturation point. SHRIMP'92, proceedingsof the symposium on shrimp farming, 20 - 22 September 1992. Hongkong. pp 45 - 50

JAKHAR, B.R.(1993) New Horizon in Agriculture in India Edited by R.C. DWIVEDI & V.S. BHATT pp - 39 - 103

JAYAGOPAL, P (1991) Productivity and profitability of prawn farming practices - An economic Analysis, M.Sc Dissertation, Cochin University of Science and Technology Cochin-6, CMFRI, pp 105

JAMIESON DAVID (1988) The Europeon Shrimp Market, shrimp '88. Proceedings of the symposium on Shrimp farming. pp 78-85.

KANO ICHIRO (1990) The Japanese shrimp Market. Past, present and Future. Technical and Economic Aspects of shrimp farming. Proceedings of the Aquatech, '90 conference, Malaysia 1-14 Jan 1990 pp 263-274

KATHIHA, P.K. and R.CHANDRA (1990) Fish Marketing Efficiency, A case study of Allahabad Fish Market, Fishing Chimes Vol. 10 No. 7 1990 (pp 21 - 28)

KUNGVANKIJ, P. (1985) Over view of penaeid shrimp culture in Asia. proceedings of the I National conference on the culture of penaeid prawns and shrimps. Philipines (1984) pp (11-25)

KRISHNAN, M,; K. VASISHTA, and B.M. SHARMA, (1991) Growth, Geographical distribution and Import penetration of shrimp Exports from India. Sea food Export Journal Vol.23 No.10 pp. 5 - 13

KUSNADI, E. W, H.C. LAMPE (1990) Marketing of common carp from the Saguling Reservoir. In Reservoir Fisheres and Aquaculture Development for Resettlement in Indonesia. Published by Perusahaan Umum Lisbrik Negara, Jakarta Indonesia.

LIAO, D.J and T.I.J. SMITH (1985) Test Marketing of fresh water Shrimp Macrobrachim rsosebergii in South Carolina. Aquaculture. Vol 23 pp373 -379

LIAO, P.S and T.I.J. SMITH (1982) Marketing of cultured prawns Macrobrachim rsosebergii in South Carolina Journal of world Aquaculture society VOL 13 pp (56 - 62)

LIONG P.C. (1991) The fatterning and culture of the mud crab in Malaysia. In THE MUD CRAB. A report of the seminar convened in Thailand, Nov 5-8 (1991). BOBP/PEP/51. pp 185 - 190.

MANWARING, G, H. ROMANO (1990) Aquaculture Marketing. A Survey of existing production. Carribbean Marine Studies Vol. No.1 pp. 2 - 10

MARICHAMY, R (1993) Prospects of crab culture and fatterning in India, Proceedings of the Business session, INDAQUA, MPEDA, Madras pp 57 - 66

MICHAEL WOOD (1987) Fish Marketing, Infofish International 6/87 pp. 42 - 43

MPEDA Publications : (1) Export Reviews 1985 - 1992
(2) PRIME Weekly (3) Annual Reports 1985 - 93.

MUTHU. M.S. (1990) Site selection and Type of farms for coastal Aquaculture of prawns. In proceedings of the I National Symposium on shrimp farming, Bombay, August 1978 MPEDA Publication pp 97 - 106

NAMBIAR, K.K.P (1990) The European shrimp Market with particular reference to culture shrimp. Proceeding of Aquatech '90 11-14 Jan: pp 284-290

NASSER, A.K.V.& A Noble (1992) Economics of prawn culture in Vypeen, Kerala with emphasis in some little-known Facts. In SD. THIPATHI, M. PAHADHIR and C.S. PURUSHOTHAMAN (eds) In Proceedings of the workshop on Aquaculture Economics 20 - 22 Nov.1991 Special publication 7(1-94), Asian Fishing society Indian branch Mangalore, India.

PILLAY, T.V.R (1990) Marketing of Aquaculture products. In Aquaculture: Principles and Practices (pp - 244 - 253)

PILLAI, N.N, C. SUSEELAN, K.N. RAJAN, P.E. SAMPSON MANICKAM, K.R. MANMADHAN NAIR and K.N. SALEELA (1993) Shrimps Lobsters, Mudcrabs, Hand book on Aquafarming, MPEDA, INDAQUA, MADRAS pp - 72.

PURUSHAN, K.S (1987) Economics on Traditional prawns farming in Kerala, Seafood Export Journal Vo.19 No.4 pp.15 - 19

RADHAKRISHNAN, E.V. (1993) Potential for Spiny Lobster culture in India. Proceedings of the Business session, INDAQUA Madras (1993) MPEDA pp 1-5

RAMAKRISHNAN, K (1980) The role of price spreads in Escalating Fish prices - A preliminary Analysis. Industrial Fisheries association-Annual 1980. CUSAT, COCHIN pp.53 - 59

RAM VARMA (1993) The Indian Seafood processing Industry. Infofish International 3/93 pp 23 - 28

RAO, K.K. and CVN. RAO (1986) Internal marketing of fish-Economics of Air Transport. Seafood Export Journal 1986 Vol.18 No.1 pp 13-15

RHODES, R.J. (1993) World Aquaculture situation and out look 1993 An overview pp 50 - 59 Aquaculture Magazine Vol.19 No.3 April/May1993.

ROSENBERRY, (1993) World shrimp Farming January/Feb. pp 38

RUELLO, N (1986) Marketing Alternatives for Aquaculture products. In Fresh water Aquaculture In Australia 1986 pp (141 - 152)

SADANADAN, R.V., K.M.MATHEW, ALPHI KARATH & V. MALIKA (1992) Internal and Export Marketing of Fresh water prawn Macrobrachium rosenbergii. Fresh water prawns, Edited by E.G.Silas, Kerala Agriculture University. proceeding of the National Symposium at Kochi. Oct. 12 - 14, 1990 pp 251 - 255

SANTHANA KRISHNAN.G, (1991) Present status and Future prospects of shrimp farming in India. Training programme on Marine Fisheries CMFRI Nov.26 - Dec.4, 1991 pp 49 - 53

SASTRY, CS. (1991) National policy for Aquaculture Development. In Aquaculture productivity edited by V.R.P Sinha and H.C. Srivastava

pp. 21 - 31.

SATHIADHAS, R., K.K.P PANIKKAR (1988) A study on Marketing structure and price behaviour of Marine fish in Tamil Nadu. Seafood Export Journal Vol.20 No.12 pp 5-29

SATHIADHAS, R., and K.K.P. PANIKKAR (1989) Marine fish Marketing trend in Kerala In Journal of Marine Biol. Asso. of India Vol.31 No.12 pp 239-246

SATHIADHAS R, K.K.P PANIKKAR, V.K. SATYAVAN and T. JACOB (1989) Economic evaluation of Paddy - Prawn Integrated farming in Kerala, Seafood Export Journal Vol.21 (11) pp 9-21

SATHIADHAS, R. (1991) Marketing structure and price behaviour of Marine fish. In Training programme on Marine Fisheries. CMFRI Nov.26-Dec.4, 1991 pp 160-171

SARVAIYA, R.T. (1987) Successful spiny lobster culture in Gujarat. Fishing chimes Vol 7 (12) pp18 - 22)

SAXENA, B.S. (1970) Price behaviour of Indian Frozen shrimps in U.S. Market. Seafood Export Journal Vol.2 No.8 pp 17 - 28

SIRILAK SUWANRANGSI (1989) Packaging of fresh and frozen fishery products. Infofish international/89 pp 15 - 21

SHANG, Y.C. (1990) Aquaculture Economic Analysis: An Introduction Marketing Infrastructure and systems, Advances in world Aquaculture Vol. 2. pp 133 - 138

SHAW, 1986) Marketing the products of Aquaculture FAO, Fish, Tech, Paper No.276. FAO. Rome (Italy) 1986, pp 106

SHETTY (1992) Proceeding of the symposium on Aquaculture Economics 20-22 Nov 1991 Special publication 7, p.94 Asian Fisheries society (AFSIB) Indian branch Mangalore, India. pp: 94

SRIBHIBHADH, A. (1985) International shrimp marketing Situation. In Australian National Prawn seminar 22 - 26 oct 1984. Edt by Rothlisbery P.C. and D.J. Hill pp 297 - 704

SRIVASTAVA, U.R. (1991) Marketing of aquaculture produce in India - Emerging opportunities for the Industry. In aquaculture productivity. Edited by V.R.P. SINHA and H.C. Srivastava pp 757 - 772

SRIVASTAVA, U.K. MD. REDDY and V.K. GUPTA (1982) Management of Marine Fishery Industry for analysis of problem in Harvesting and processing. India Institute of Management.pp227

SRIVASTAVA (1989) Aquaculture - Marketing and Economics in India Indian Institute of Management. In Aquaculture: Needs for 2000 AD Oxford Publishers Madras pp 211 - 224.

SRIVASTAVA, U.K. DESAI D.K. GUPTA.V. KRAO.S.S, GUPTA G.S, RAGAVACHARI M, VATHSALA. S., SINGHA. J, BHARATHI. V.R. (1984) Inland Fish Marketing in India Vol. 1-8

SRIVASTAVA, U.K; D.K. GUPTA; V.K. RAO (1984) Marine Fish Marketing in India. Vol: 1-6, Indian Institute of Management, Ahmedebad.

SUKUMARAN, C.T. (1992) Marine products Export from India - A development Prospective. 9th the Indian seafood Trade Feb 92, Souvenir, 7-9 Feb, 1992 pp 1-6

SWAMY, P.K. (1991) Present status and future prospects of Seafood Export from India, Proceedings of the National Workshop on Fishery Resources data and the Fishing Industry, 14-15 Oct 1988. Visakhapatanam, Fishery survey of India, Bombay 1991, pp 45 - 66

UMADEVI, DANIEL & GEORGE (1993) Processing, Quality control and Marketing - Hand book on Aquafarming. MPEDA INDAQUA, Madras. pp 151.

WOOD, J, COULTER and I. RAJENDRAN (1991) India's Expanding prawn culture Industry - Where will the raw materials come from? In Aquaculture productivity, Edited by V.R.P. sinha and H.C. SRIVASTAVA. pp 257 - 268

A P P E N D I X . A

CLASSIFICATION OF PRAWN FARMING SYSTEMS

Sl. No.	PARAMETERS	TRADITIONAL CULTURE		SCIENTIFIC FARMING	
		SEASONAL	PERRENNIAL	EXTENSIVE	SEMI-INTENSIVE
1.	POND SIZE (ha)	2-10 ha	2-10 ha	1-3 ha	0.5-1 ha
2.	STOCKING DENSITY	unknown	unknown	3-6 / m^2	8-20 m^2
3.	SEED SOURCE	Wild	Wild	Wild+ Hatchery	Hatchery
4.	WATER SOURCE	Tidal	Tidal	Tidal + Pump	Pump
5.	FEED	Natural	Natural	Natural + supplementary	Pellet feeding
6.	DURATION	5-6 months	12 months	4-5 months	4 months
7.	SURVIVAL	unknown	unknown	50-60%	70%
8.	STOCKING SIZE	Autostocking	Autostocking	PL - 20	PL - 20
9.	HARVEST	Periodic	Periodic	Final	Final
10.	PRODUCTION	200-500 kg/ha/year	500-1000/ha/ year	2000-3000 kg/ha/ year	8000-10000 kg/ha/year
11.	PRODUCTS	M.dobsoni - 60%	M.dobsoni - 60%	P.monodon (uniform size)	P. monodon (uniform grade
		P.indicus - 30%	P.indicus - 30%	(20kg, 30/kg,40/kg 50/kg,60/kg headon	(16-20/lb,21-25/lb,26-30/ lb,31-35/lb,36-40/lb headless)
		M.monoceros - 5%	M.monoceros -5%	P.indicus(uniform size)	P.indicus (uniform size)
		P.monodon - 3%	P.monodon - 3%	(50/kg,60/kg,70/kg, 80/kg, 100/kg	(36-40/lb,41-50/lb,51-60/)lb,61-70/lb headless)
12.	MARKETING	EXPORT & DOMESTIC	EXPORT & DOMESTIC	EXPORT ONLY	DIRECT EXPORT

Source: 1. Handbook on Aquafarming (1993) - Shrimps, Lobsters and Crabs - INDAQUA (MPEDA)

2. Handbook of Shrimp Farming - 1991 MPEDA

A P P E N D I X B

CENTRAL MARINE FISHERIES RESEARCH INSTITUTE POST GRADUATE PROGRAMME IN MARICULTURE

MARKETING CHANNELS AND PRICE SPREAD OF AQUACULTURE PRODUCTS

SCHEDULE I
(PRODUCER)

Respondent No:

I. (1) Name :

(2) Address :

II. (1) Area of Farm :

(2) Technology of Farming : Perennial/Seasonal,/Intensive/ Semi Intensire.

(3) Production/ha/crop : 1990.....1991.....1992.....

(4) Total inputs : Rs./ha.

(5) Ownership of fond : Owned/lease

(6) Lease value :

III. (Marketing)

(1) Total Production/ha, : 1993 .....

(2) Product composition and GRADING SYSTEM

Species	Count/kg GRADE	Farm Rate (Rs./Kg.)	% Quantity	% Value
WHITE TIGHER BROWN FINFISHES CRAB				
		Total	Revenue	

(3) Marketing Channels :

(4) Role of Intermediaries :

(5) Marketing Expenses. (If any) :

(6) Financial Assistance (if any) :

(7) Remarks

Name of Investigator,

Place :

Date :

Signature:

A P P E N D I X C

CENTRAL MARINE FISHERIES RESEARCH INSTITUTE

POST GRADUATE PROGRAMME IN MARICULTURE

MARKETING CHANNELS AND PRICE SPREAD OF AQUACULTURE PRODUCTS

SCHEDULE II

(MARKETING INTERMEDIARIES)

Respondent No:

I.(1) Name :

(2) Address :

(3) Role in Marketing :

EXPORT MARKETING	DOMESTIC MARKETING
1. Financier Cum Agent	1. Wholesaler
2. Preharvest contractor	2. Preharvest contractor
3. Pre-Processing centre	3. Cold Storage
4. Peeling shed Agents	4. Local Markets
5. Processing centre	5. Worker cum Vender

2. (1) Price of Raw Material

Species	Grade	Rate/Kg (Raw-Material)	Rate Semi-Processed
WHITE TIGER BROWN			

(2) Grading Method

EXPORT	(1) HL product Grading (2) PUD Product grading	DOMESTIC	(1) FIN FISHES (2) CRAB

(2) Marketing Channels.

3. (1) Marketing Expenses.

(a) Cost of Ice.

(b) Cost of Transport

(c) Pre-Processing Charges (Peeling charges)

- White (HL) ------
  Tiger (HL) ------
  Brown (PUD) ------

(2) Problems of Marketing
(3) Hyigenic and quality standards
(4) Financial Assistance (If any)
(5) Remarks

Name of Investigator.

Place :

Date :

Signature

A P P E N D I X D

CENTRAL MARINE FISHERIES RESEARCH INSTITUTE

POST GRADUATE PROGRAMME IN MARICULTURE

MARKETING CHANNELS AND PRICE SPREAD OF AQUACULTURE PRODUCTS

SCHEDULE III

(EXPORTER)

I (1) Name :

(2) Address :

II. (1) Location of Exporting Unit and Type of Processing-Block/IQF

(2) Role in Marketing : Exporter/Processing and Exporting.

(3) Capacity of the Plant(Kg/day)

(4) Total no of workers

(5) Sources of Aquaculture Products

(6) Share of Aquaculture Products. (%)

(7) Major markets : JAPAN/USA/W. Europe/Others

III.(1) Price

Quantity	GRADE	PURCHASE RATE (Rs/Kg)	CIF RATE	CONSUMER PRICE
White Tiger Brown				

(2) Grading Method

(a) HL Product Grading

(b) PUD Product grading

(3) Marketing Channels - Exportor/Buyer/Super Market/Consumer

IV. Marketing Expenses

(1) Processing Expenses if any

(2) Cargo charges (Shipping)

(3) Customs and duty expenses

(4) Problems of marketing.

Place :

Date :

Name of Investigator,

Signature :